voted to
XTILE
EMISTRY
EACHING
YEING
RINTING
NISHING

IL 10, 1944
ME 33, No. 8

AMERICAN
DYESTUFF REPORTER

Solophenyl* -

what it means to you

In the last few years you have seen the term *Solophenyl* used for a limited but steadily increasing range of Direct dyestuffs for Rayon or Cotton.

Perhaps you have tried a few of the *Solophenyl* colors and know their present and post-war importance in the field of Rayon, Cotton and mixed fibres including Union Goods . . .

And have definitely fixed in your mind that *Solophenyl* means "tops" in fastness to light of Direct Colors.

If you haven't tried the Geigy *Solophenyl* Series, exposure to the Sun will be most convincing.

*Reg. U. S. Patent Office

GEIGY COMPANY INC.

89-91 BARCLAY STREET — NEW YORK — NEW YORK

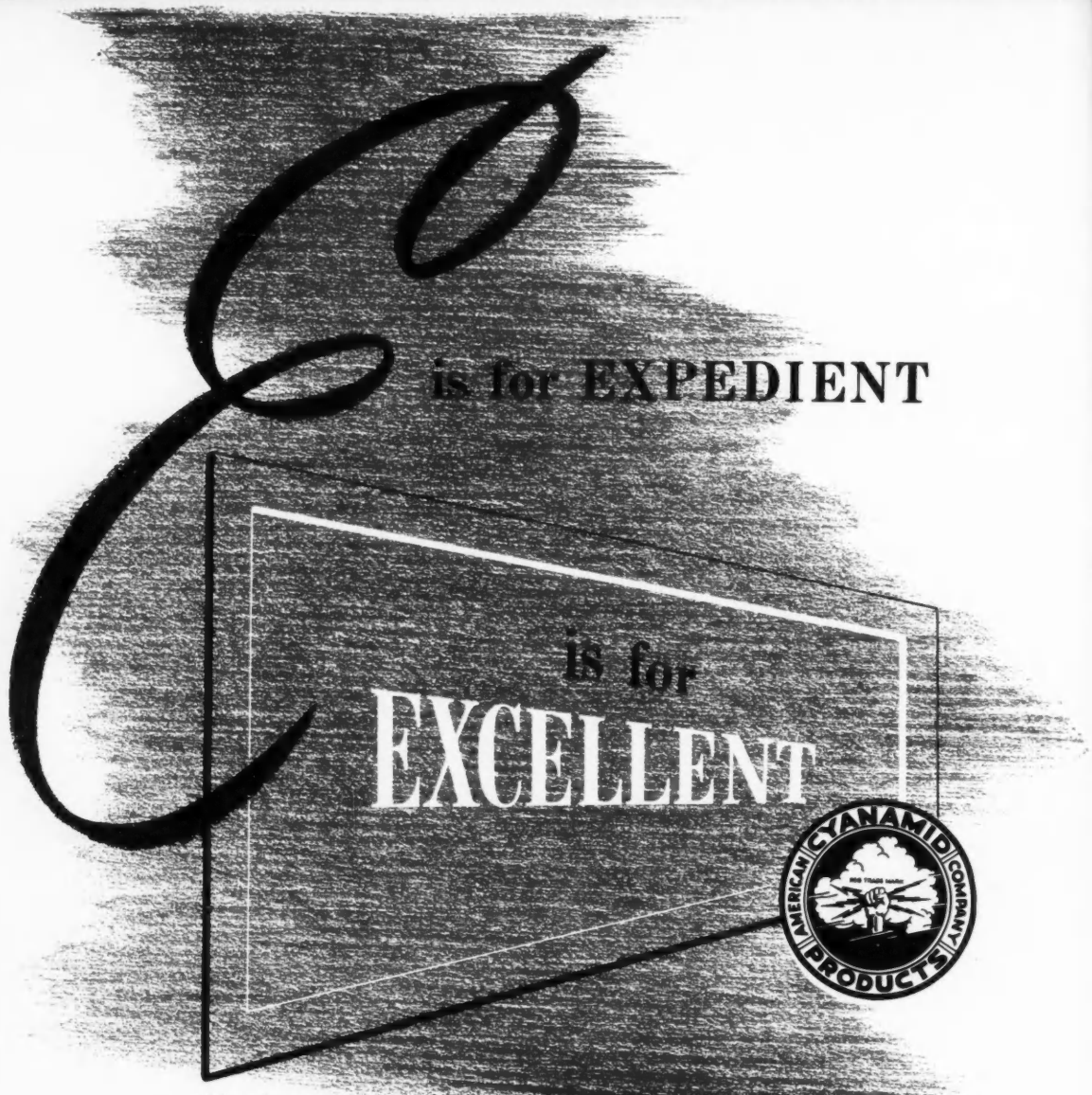
Boston · Providence
Philadelphia · Charlotte
Toronto · Portland, Ore.

Geigy
Dyestuff Makers Since 1859

In Great Britain
The Geigy Colour Co., Ltd.
National Buildings
Parsonage, Manchester

UNIVERSITY OF NEBRASKA
AGRICULTURAL LIBRARY
APR 24 1944

AL PUBLICATION
of the
ROCEEDINGS
CAN ASSOCIATION
XTILE CHEMISTS
D COLORISTS



"Good enough to get by" is all that many manufacturers expected of wartime substitutes for "old reliable" materials gone critical and placed on strict war-essential priority basis.

But one of the happy paradoxes of wartime industry has been the proving out of many new war-born chemical developments . . . achieving practical results that assure these "new faces" on the chemical scene of having permanent places in the larder of the Nation's chemical resources.

Developing new alternate materials and improving old uses for well-known non-critical materials has been an important phase of Cyanamid's wartime development and manufacture. Because of this experience, Cyanamid is prepared to counsel users of chemicals in industry on the ways and means of applying worthy materials, both new and old. to the solution of post-war product plans

AMERICAN CYANAMID & CHEMICAL CORPORATION

(A Unit of American Cyanamid Company)

30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

MANUFACTURERS OF

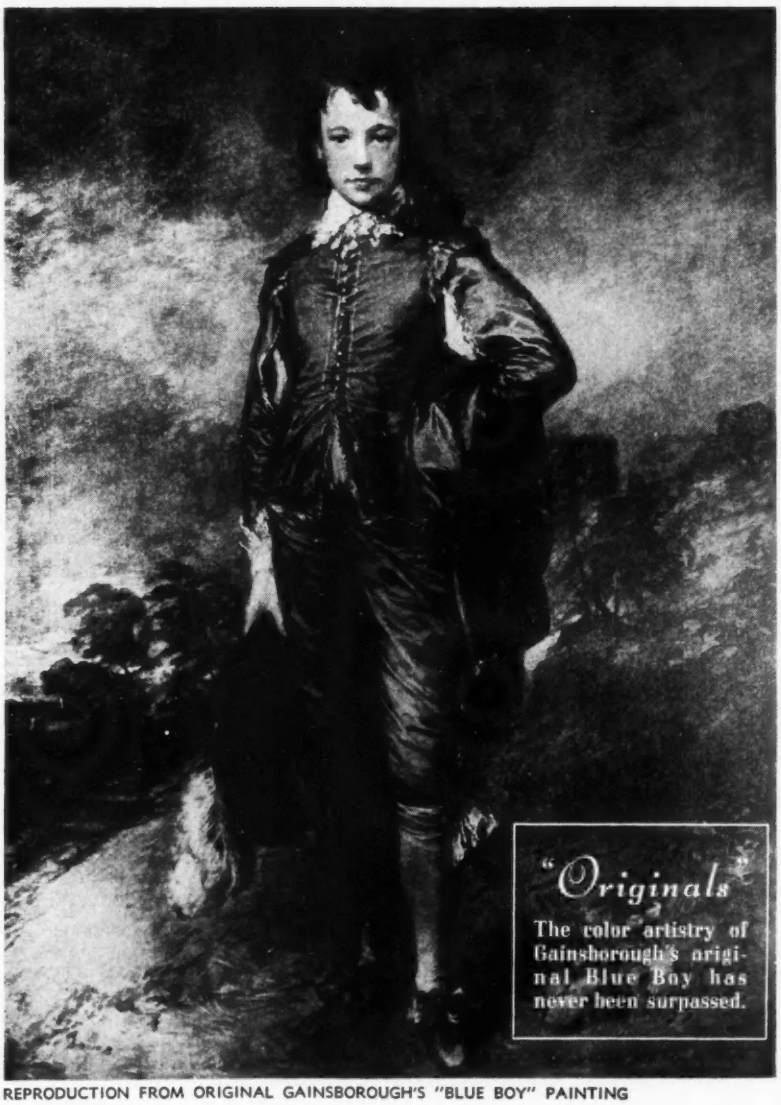
SULPHONATED OILS • PENETRANTS • FINISHES • SOFTENERS

SIZING COMPOUNDS • DECERESOL* WETTING AGENTS

AND OTHER SPECIALTIES FOR THE TEXTILE INDUSTRY

**Reg. U. S. Pat. Off.*

American Dyestuff Reporter, Vol. 33, No. 8, April 10, 1944. Published every other Monday. Copyright, 1944, by Howes Publishing Co., 440 4th Ave. New York, 16, N. Y. Domestic subscriptions, $5.00; Canadian, $6.00; Foreign, $6.00. Entered as second-class matter, Nov. 6, 1919, at the New York, N. Y. Post Office, under the act of March 3, 1879.



REPRODUCTION FROM ORIGINAL GAINSBOROUGH'S "BLUE BOY" PAINTING

Ciba BLUE 2B

A World Famous Original Dyestuff

Brilliance of shade combined with low prices, has, from its inception, made its universal application a practical necessity.

Even today the standard.

DYESTUFFS • CHEMICALS • INTERMEDIATES

CIBA COMPANY INC.

Greenwich & Morton Sts.
NEW YORK

BOSTON - CHICAGO - MONTREAL - CHARLOTTE
PROVIDENCE - SAN FRANCISCO - PHILADELPHIA

VAT DYES OF THE DOW CHEMICAL COMPANY

Creative Chemistry at its best . . .

"To describe the task of the chemist who creates new products out of neglected raw materials, Dr. Edwin E. Slossen coined the name Creative Chemistry. No more shining example of Creative Chemistry at its highest and best can be found than the proud record of accomplishment of Hercules Powder Company in the field of terpene and rosin chemistry."

DAVID DIETZ, *Science Editor of the Scripps-Howard Newspapers, Author, Pulitzer Prize Winner*

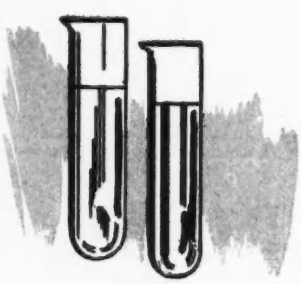
A TWENTY-FIVE YEAR TASK

"Twenty-five years ago Hercules launched its researches into wood rosin, wood turpentine, and pine oil—materials that the industrial world had neglected and ignored. Over the years, Hercules built an outstanding research and technical staff, one of the world's important laboratories, and maintained the courage to risk millions of dollars in development work and new plant facilities."

WHAT HERCULES HAS ACHIEVED

. . . *with Rosin*

From unstable, dark, wood rosin, Hercules chemists created superior pale rosins; they then stabilized these rosins by both hydrogenation and polymerization; they developed a large number of other purified, tailor-made rosins and rosin esters for hundreds of specialized purposes.



. . . *with Turpentine*

From crude wood turpentine Hercules chemists uncovered a whole new series of useful terpene chemicals. They achieved the first synthetic production of para-cymene. They created alpha pinene for the synthesis of camphor, and introduced many new bases for alkyds and terpene alcohols.

. . . *from Pine Oil*

Hercules chemists began their studies pine oil when few industrial uses ex for it. From this long and costly rese have come special derivatives for and better flotation reagents, disi tants, insecticides, scouring agents, d gent assistants, and wetting agents.

HERCULES TERPENE AND ROSIN CHEMICALS

M1-60

HERCULES POWDER COMPANY, 993 Market Street, Wilmington 99, Delaware

April 1

ONYX

ETERNALURE

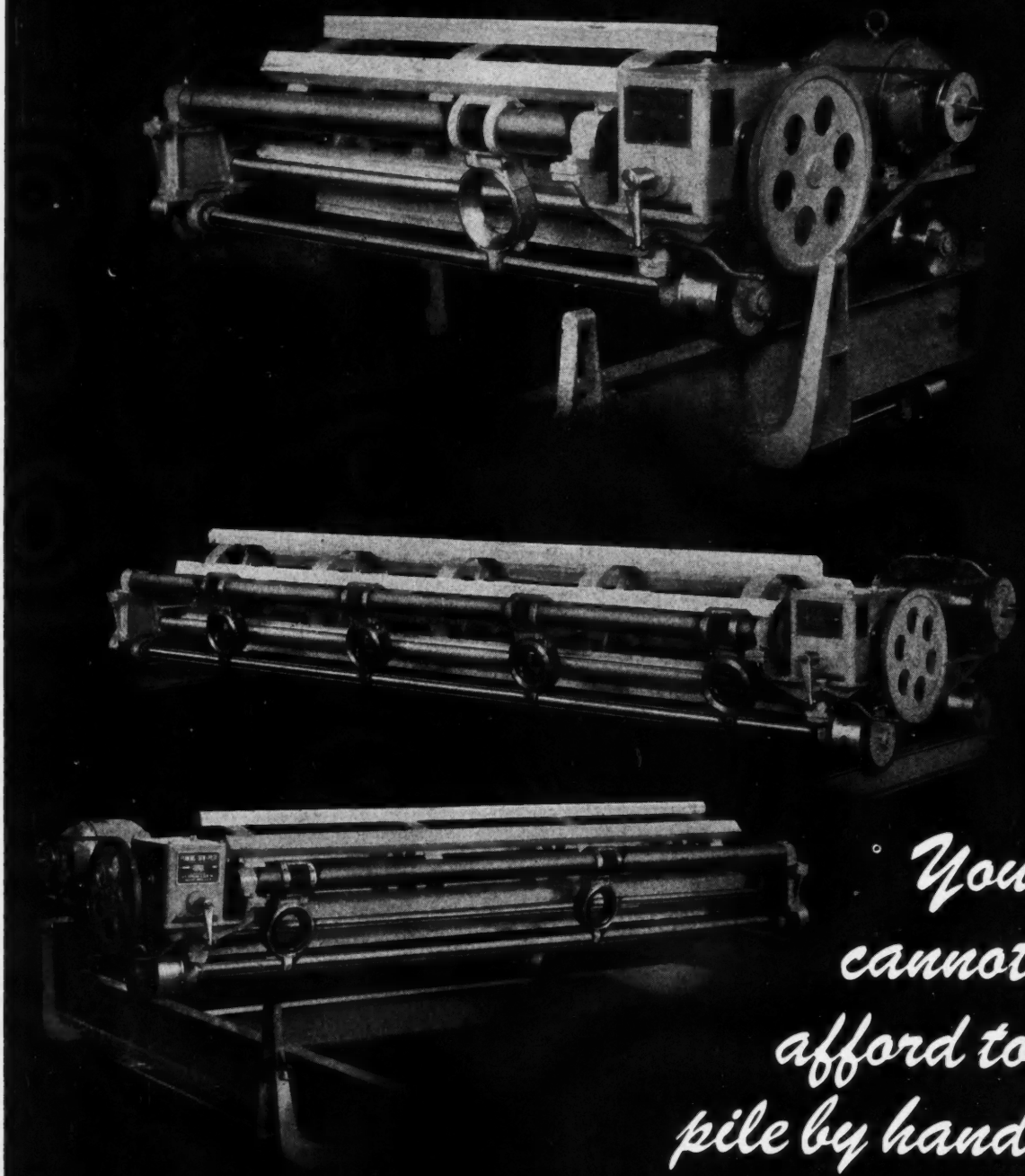
A complete line of finishes of exceptional merit for the production of hosiery to meet the most discriminating tastes.

Inquiries are solicited

ONYX OIL & CHEMICAL COMPANY
JERSEY CITY, N. J.

PERKINS AUTOMATIC BIN PILERS

PATENTED



You cannot afford to pile by hand

B. F. PERKINS & SON, INC.

ENGINEERS AND MANUFACTURERS

HOLYOKE • • • MASSACHUSETTS

AFTER THE WAR

After the storm of war is over...there will be a rainbow of more cheerful colors breaking over the world which will echo new notes of courage and optimism. When we have won this conflict, the sombre hues and drab garbs of these dimout days will be supplanted by an inevitable reversion to brighter colors.

When peace comes, General's phenomenal war production will be converted to peacetime requirements, releasing unlimited quantities of the finest and most durable dyestuffs known.

GENERAL DYESTUFF CORPORATION

QUALITY DYESTUFFS

SCIENCE has made it possible to increase wetting speed in wet processing of textiles, to a degree believed impossible only a few short years ago.

But speed alone is by no means the sole essential. *Uniformity*—drum after drum, month after month—is vitally important.

You may get a sample of a wetting agent which is speedy at a low concentration. But will that speed stay constant for each multiple-drum shipment, each batch the maker produces? What is your assurance of such uniformity, to give you a constantly good money value?

The manufacturer must set up and rigidly maintain controls that will make it virtually impossible to vary in product uniformity.

Houghton has such a control system. Our laboratory will not release a batch until after it has been pronounced O.K. after standard tests have been made under careful supervision.

With a definitely faster wetting speed than most agents, SURFAX W. O. stays sold because it stays uniform. Plant men know they can depend on it. Which is another vital reason for the popularity of this product.

Are you seeking a fast, uniform wetting agent? Ask the Houghton Man or write:

E. F. HOUGHTON & CO.
303 W. Lehigh Avenue, Philadelphia
1301-05 W. Morehead Street, Charlotte

SURFAX W.O.

FOR S-P-E-E-D IN WETTING OUT

HIGH-STYLE RAYON STEPS OUT WEARING CROWN* TESTED AMBER TAG

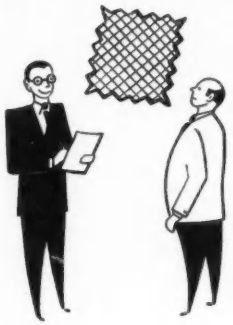
No. 25 of a series—from our files on the new "CROWN" Tested Plan

Here's the story of Duchess Fabrics' rayon and cotton bengaline... one of the first fabrics for evening wear, bridal wear, and children's party dresses to be launched under the CROWN Tested Plan.

When Duchess Fabrics first brought this fabric to us for CROWN Testing, we were impressed by its beauty and serviceability. It came in a wide range of lovely colors. And it met all CROWN Tested requirements... except one. Preliminary tests showed that the dimensional restorability was slightly off.

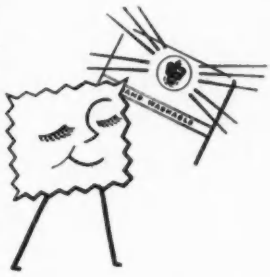
Now Duchess wanted their cloth to be equally appropriate for hand washable children's dresses and for dry cleanable evening wear. And... in order to pass these requirements... it had to have a dimensional restorability of 2%. It appeared the answer might be in the handling of the fabric during finishing.

So we got together with Duchess Fabrics and their finisher, La Francaise, and discussed the problem. A new routine was worked out. This procedure did away with unnecessary pulling and strain on the fabric... in fact reduced mechanical handling to such an extent that it became practically tensionless.



A simple enough change ...but it got results! The next sample that came up for testing proved the problem was licked.

Now this bengaline (51% rayon, 49% cotton) goes to market under the CROWN Tested Amber tag. It can be safely dry cleaned... it can even be satisfactorily hand washed! It meets not only the 2% dimensional restorability, but all these other CROWN Tested requirements as well:



Laundering temperature	105° F.
Resistance to seam slippage	15 lbs.
Resistance to perspiration	Acid & Alkaline
Resistance to atmospheric fading	AATCC Test
Resistance to sun fading	10 hrs.

Maybe you too would like to work toward improved fabric serviceability. Let us show how the CROWN Tested Plan can help you achieve ... and dramatize ... better fabric performance.

Begin TODAY to Plan for TOMORROW

Use the CROWN Tested Plan to perfect your rayon fabrics. Because here's something you can count on ... both now and after the war: more dependable fabrics mean increased consumer confidence.

There are CROWN Tested facilities for fabric research ... for the solution of mill problems... for dye stuff testing. Any or all of them are at your disposal. So if you buy, sell or process rayon fabrics ... why not do your postwar planning the CROWN Tested way? You'll benefit now, and you'll build for the future too!

CROWN TESTED RAYON FABRIC

A better way to buy Rayon Fabrics—This identification is awarded only to fabrics containing CROWN rayon, after they have passed the CROWN Tests for serviceability.

New Informative Labeling

CONSUMER SATISFACTION UNDER THE THREE TAG SYSTEM

"Crown" Tested Rayon Fabric

This is a stabilized fabric. Tests predict it will not change visibly in color or in texture, nor in size more than 2%, if instructions are followed. Samples of every dye lot of this fabric have been tested for stability and strength, according to minimum requirements set and maintained by

AMERICAN VISCOSE CORPORATION

Producer of CROWN *Rayon Yarns and Staple Fibers*

Sales Offices: 350 Fifth Avenue, N. Y. C. 1; Providence, R. I.; Charlotte, N. C.; Philadelphia, Pa.

*Reg. U. S. Pat. Off.

Announcing

SELLOGEN A S
SELLOGEN M

All-purpose, powdered wetting agents and detergents for wool...for cotton...for synthetic fibers

● These new, highly efficient products have a wide range of uses. They give equally satisfactory results with *all* textile fibers. Used with WOOL for rinsing after fulling, scouring and dyeing yarn and piece goods, backwashing and dyeing tops. With COTTON for kier boiling, dyeing, soaping and scouring. With SYNTHETIC FIBERS for dyeing and scouring. These twin products can bring important, time-saving advantages to your business. Samples on application.

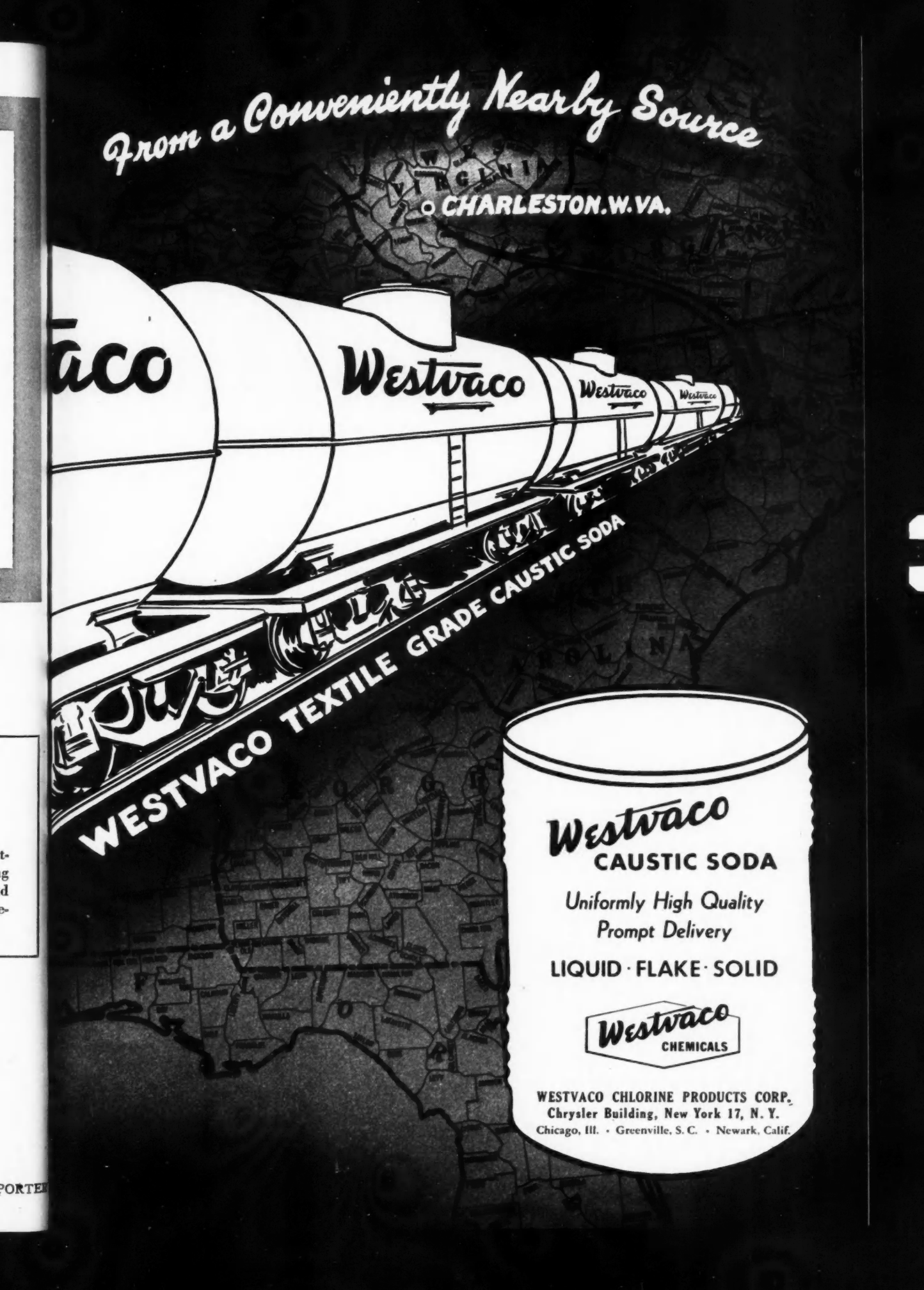
SELLOGEN A S
has extreme wetting properties.

SELLOGEN M
combines wetting with high detergency. Resistant to hard and limy waters—extreme cleansing action, excellent sudsing. Can be used in acid or alkaline solutions. Recommended as a penetrator in dyeing, in boiling off.

WOLF BRAND PRODUCTS

JACQUES WOLF & CO.
Chemicals PASSAIC, N. J.

WAREHOUSES: Providence, R. I., Philadelphia, Pa., Utica, N. Y., Chicago, Ill., Greenville, S. C., Chattanooga, Tenn., Knoxville, Tenn., Charlotte, N. C., Milwaukee, Wisc., Columbus, Ga.


From a Conveniently Nearby Source
CHARLESTON, W. VA.
Westvaco
WESTVACO TEXTILE GRADE CAUSTIC SODA
Westvaco
CAUSTIC SODA
Uniformly High Quality
Prompt Delivery
LIQUID · FLAKE · SOLID
Westvaco
CHEMICALS
WESTVACO CHLORINE PRODUCTS CORP.
Chrysler Building, New York 17, N. Y.
Chicago, Ill. · Greenville, S. C. · Newark, Calif.

REWARD

Maybe you are not thinking of rewards in connection with water repellents—but just the same we are offering them, and making no bones about it.

"Sure," you say, "for a price!" Well, that's right, and you will be surprised—agreeably. Then, in our "Cravenette" CBC water repelling preparations for all-wool, or all-cotton fabrics there are these virtues—water repellency by the one-bath method; easy application; stability under wide temperature ranges and variable conditions; liquidity at high and low temperatures. Then add that it can be applied from a washer or a standing bath, is accurately compounded, is odorless, and has a minimum effect on feel and appearance of the fabric—and you have got something.

But mere technical perfection won't bring orders—it is what your customer, and his customer thinks of what you give him that decides how big the orders will be. With "Cravenette" water repellents and the use of the trademark "Cravenette," you receive the good will of everyone who has to buy or sell your fabric all along the line. And that's no small reward!

Write us for more particulars about our "Cravenette" water repelling preparations. Also, if you wish an adequate sample we will be glad to send it.

Your fabric treated with

REG. U.S. PAT. OFF.

CRAVENETTE

water repelling preparations

SHEDS SHOWERS

"CRAVENETTE" is a trademark of the Cravenette Co., U. S. A., manufacturers and sellers of water repelling preparations. The Cravenette Co., U. S. A., and its licensed agents, apply these preparations to fabrics and garments.

CRAVENETTE CO., U. S. A.
CHEMICALS DIVISION
8th and Madison Streets, Hoboken, N. J.

Eastone* Scarlet BG

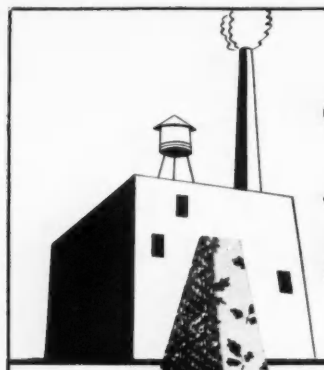
Eastone* Scarlet BG, a dyestuff with exceptional stability to heat, levels well at either high or low temperatures. It dyes cellulose acetate rayon clear bright shades of scarlet, and nylon clear neutral shades of red. Eastone Scarlet BG is satisfactorily used both in combination with other dyestuffs and as a self shade.

General commercial fastness properties of Eastone Scarlet BG are good, and dyed shades of this color have excellent resistance to atmospheric fading. Fastness to subliming recommends Eastone Scarlet BG for application printing. It is suitable for either jig or box dyeing, and the color can be stripped from dyed pieces.

Eastman Acetate Dyestuffs are available in a wide variety of colors especially developed for cellulose acetate rayon. For information on these dyestuffs, consult our New York Sales Representative, 10 East 40th St., New York, N. Y., or write TENNESSEE EASTMAN CORPORATION (Subsidiary of Eastman Kodak Company), KINGSPORT, TENNESSEE.

EASTMAN ACETATE DYESTUFFS

** "Eastone" is a registered trade mark and denotes a type of dye which is dischargeable, as well as usable for plain dyeing.*



COUNTLESS *Busy Textile Mills* DEPEND ON *Olate* FOR SAFE PROCESSING

TODAY'S tight production schedules leave no room for processing errors. Fabrics must be turned out fast . . . quality specifications must be met to the letter!

That's why so many busy mills are depending today on Olate for their wet finishing operations. For this pure, neutral, low titer soap is made expressly to provide the maximum in safe, thorough, trouble-free processing . . . designed to help textile mills "deliver the goods."

Olate solutions are fluid, thanks to its low titer. You get thorough, even penetration of the cloth. You get protection against bare spots, uneven shrinkage, non-uniform fulling and poor felting. And you get the free rinsing so important in producing clean, sweet-smelling goods.

Yes, Olate is helping many textile mills to avoid costly processing errors. Perhaps there's a spot in *your* mill where Olate can help smooth out production.

"TOPS" for RAYONS and ACETATES

In scouring and dyeing rayon and acetate fabrics, you'll see concrete evidence of Olate's gentleness and safety. You'll see it in even shrinkage . . . in the splendid protection it provides against such costly trouble-makers as streaks, dye blotches, and chafe marks.

"TOPS" for WOOLENS, too

You can count on Olate to give you an efficient scouring and fulling job on woolens and worsteds. Olate has the all-important lubricating properties for these operations. Splendid detergent and emulsifying properties, too. Olate loses no time in loosening the dirt and oil in these fabrics . . . and holds them in suspension until they can be flushed thoroughly from the fibers.

Olate—*Safe and efficient for every textile soap usage*

PROCTER & GAMBLE

OFFICIAL U. S. NAVY PHOTO

By releasing this page, Ceglin Finish for Textiles makes it possible to present one of the many essential services being rendered by Sylvania Cellophane.*

Protective Wrappings . . .

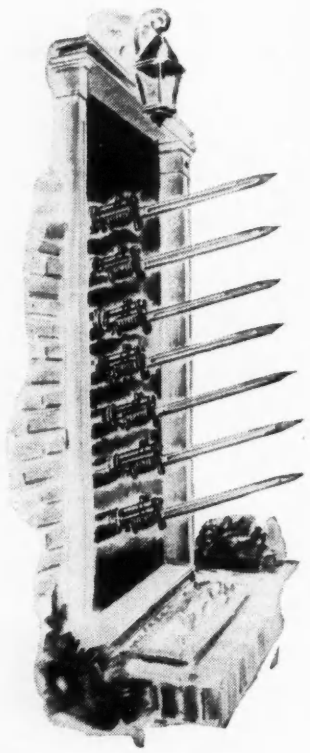
To insure their arrival in perfect condition, shipments of engine parts, rifles, small ordnance and replacements are wrapped in a laminated sheet of cellophane and fabric. ★ This provides an individual, highly moisture-proof, fully-sealed, protective covering.

SYLVANIA INDUSTRIAL CORPORATION

General Sales Office: 122 E. 42nd St., N. Y. 17, N. Y.
Works and Principal Office: Fredericksburg, Va.

*Trade Mark Reg. U.S. Pat. Office

The fight on the doorstep



THIS WAR can't be won on battlefields alone. One of the most critical campaigns of all must be waged right on the doorstep of every family in America.

This is the fight against higher prices and higher wages. It's a fight that *must* be won... or victories on battlefields will be meaningless.

It's like this. In America this year, our total income after taxes will be about 133 billion dollars. But there'll be only about 93 billion dollars' worth of goods to spend it on. If we all start trying to buy as much as we can, prices will shoot up.

As prices rise, people will ask for—and, in many cases, get—higher wages. That will put up the cost of manufacturing, so up will go prices again. Then we'll need another pay raise. If we get it, prices rise again. It's a vicious circle.

The Government has done a lot to help keep prices down. It has put ceilings on food and rent... has rationed scarce articles. But the Government can't do it all alone.

It needs *your help!*

Your part in this fight won't be easy. It will mean foregoing luxuries, perhaps doing without a few necessities. Tough? Maybe... but don't say that where the veterans of Italy and New Britain can hear you!

You *want* to do your part, of course. So do we all... farmers, laborers, white-collar workers, business executives. And the way to do your part *right* now is to observe the following seven rules for Victory and a prosperous peace...

1. Buy only what you NEED. And before you buy anything, remember that patriotic little jingle: "Use it up. Wear it out. Make it do or do without."

2. Keep your OWN prices DOWN! If you sell goods, or your own time and labor, *don't ask for more money* than you absolutely must! No matter who tries to talk you into asking more... *don't listen!*

3. No matter how badly you need something... *never pay more than the posted ceiling price!* Don't buy rationed goods without giving up the required coupons. If you do, you're helping the Black Market gang—hurting yourself!

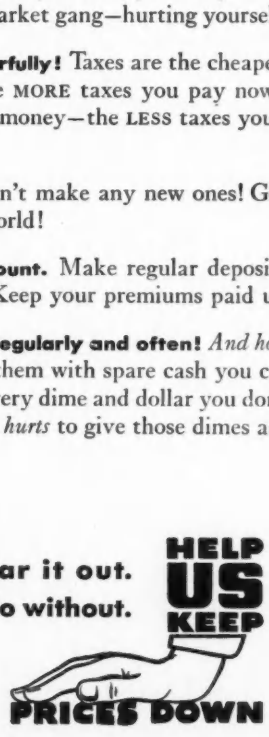
4. Pay your taxes cheerfully! Taxes are the cheapest way to pay for a war! The MORE taxes you pay now—when you have some extra money—the LESS taxes you'll pay later on!

5. Pay off old debts. Don't make any new ones! Get, *and stay,* square with the world!

6. Start a savings account. Make regular deposits, often! Buy life insurance. Keep your premiums paid up.

7. Buy War Bonds . . . regularly and often! *And hold on to them!* Don't just buy them with spare cash you can easily do without. Invest every dime and dollar you don't actually NEED... even if it *hurts* to give those dimes and dollars up!

Use it up... Wear it out.
Make it do... Or do without.



A United States War message prepared by the War Advertising Council; approved by the Office of War Information; and contributed by the Magazine Publishers of America.

FLAME RETARDANT

WATER REPELLENT

WEATHER RESISTANT

MILDEW PROOF

GET THIS STORY ON

clorafin*

Finished Fabrics!

PROBLEM . . . To finish military canvas duck for tents and tarpaulins. Fabric must withstand conditions of active service everywhere in desert, tropics, snowfields. It *must* be highly resistant to flame, water, mildew, and weather.

SOLUTION . . . To fill this demand Hercules turned to a product which does these *four* jobs in *one* operation—Clorafin. Finishes made with this chlorinated paraffin have met all the exacting Army specification tests, and today are giving excellent service with our fighting men wherever they go.

SUGGESTION . . . The success of Hercules Clorafin finishes in war points the way for uses in peacetime products. Lawn furniture, camping gear, awnings, farm machinery covers, carpets —the list is long indeed!

FREE NEW BOOKLET ON CLORAFIN

A new 8-page booklet not only offers helpful technical information, but lists many postwar possibilities of interest to you. Send in this coupon today for your free copy.

*Reg. U. S. Pat. Off.

CELLULOSE PRODUCTS DEPARTMENT
HERCULES POWDER COMPANY
INCORPORATED
994 MARKET STREET, WILMINGTON 99, DELAWARE
Please send free 8-page Clorafin booklet to:

Name.....

Company.....

Address.....

CF-43

Are you properly emphasizing the SAVINGS FEATURE OF YOUR PLANT'S PAYROLL SAVINGS PLAN?

WITH the war swinging into its tensest phase, now's the time to emphasize over and over again the *savings* feature of your Payroll Savings Plan. To press home to all your people the need of building up their savings—the need of building up their savings not only in wartime but also in the years directly after the war. To point out that a bond cashed before its full maturity is a bond killed before it has given its fullest service to its owner—*or to his country!*

Buying War Bonds, holding War Bonds, and keeping wartime savings mounting—all are absolutely vital. But no one of these is enough by itself. The *savings habit* must be carried over into the years of reconstruction which will follow the war. For if, at war's end, we have 'flash-in-the-pan' spending, *everybody loses.* The spender loses, you lose, and the country loses! While a working public, convinced of the value of continued, planned saving, is the soundest possible foundation for private enterprise of every sort.

We call these bonds War Bonds—and with their aid we will win this war at the earliest possible moment! But they're Peace Bonds, too—and, rightly used, they will win for their holders, *and for all of us,* a happy and prosperous place in the years of peace to come. WAR BONDS to Have and to Hold.

The Treasury Department acknowledges with appreciation the publication of this message by

AMERICAN DYESTUFF REPORTER

★ Let's All Back ★ the Attack... ★ with War Bonds!

This is an official U. S. Treasury advertisement—prepared under auspices of Treasury Department and War Advertising Council

The man who makes friends
by
LOOKING FOR TROUBLE

Helping you to maintain standards of shade and fastness despite variations in raw stock and manpower shortages all through the mill is the primary job of National Technical Service today.

"Trouble Shooters" in the full sense of the word, National Technical Service men have the two-fold advantage of National's composite experience in every field where color is used, *plus* the fully-staffed facilities of laboratories attached to all principal National offices.

This service offers practical help on color, dyehouse and printing problems...in maintaining standards and controlling costs on established production...in working out economical formulas on new textiles...in expediting delivery of available National Dyes.

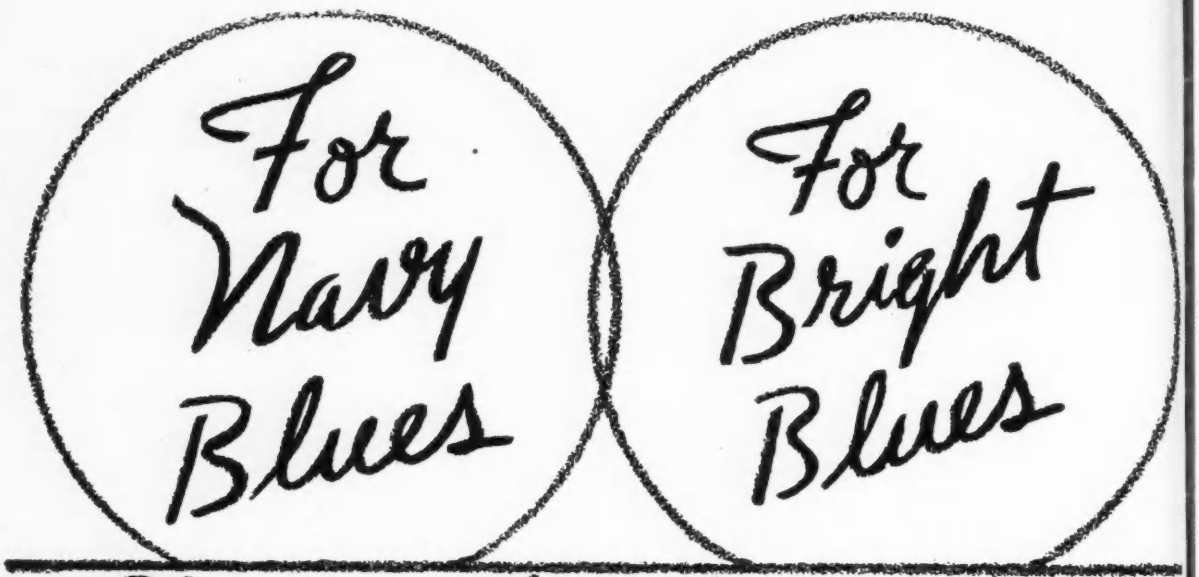
We invite you to make full use of friendly, nearby National Technical Service.

NATIONAL ANILINE DIVISION

ALLIED CHEMICAL & DYE CORPORATION

40 RECTOR STREET, NEW YORK, N. Y.

BOSTON, PROVIDENCE, CHICAGO, PHILADELPHIA, SAN FRANCISCO, CHARLOTTE, GREENSBORO, ATLANTA, NEW ORLEANS, CHATTANOOGA, PORTLAND, ORE., TORONTO



Pharmasols

Blue GNXX
Blue GDNN

THESE azoic colors, for printing cotton, linen or rayon, produce Navy Blue of good fastness at a low cost. In combination with the Pharmasol Yellows they produce deep Browns.

PHARMASOLS are stabilized solutions, adjusted to the most practical concentration, which can be easily applied with a maximum of efficiency.

PHARMASOLS do not decompose and thereby they overcome the otherwise problems of troublesome dissolving.

Indigosol

BLUE IBC

THE outstanding soluble vat color for producing bright Blues in any depth, of excellent fastness, is Indigosol Blue IBC. It is suitable for dyeing, padding and printing on cotton, linen or rayon (excepting acetate fibres) where maximum fastness is required.

Indigosol Blue IBC is an important member of the group of very fast Indigosols, all of which are readily soluble and easily developed.

CARBIC COLOR AND CHEMICAL CO., INC.

451-453 Washington Street, New York City

BRANCHES:
PHILADELPHIA
PROVIDENCE HAMILTON, ONT.
CHARLOTTE, N. C.

IMPORTERS OF THE MANUFACTURES OF
DURAND & HUGUENIN S. A.
BASLE, SWITZERLAND

EXCLUSIVE DISTRIBUTORS OF
PHARMASOLS
PHARMOLS
PHARMACINES

Representative: Los Angeles (Hathaway Allied Products)

AMERICAN DYESTUFF REPORTER

A. P. HOWES
Publisher

LOUIS A. OLNEY, D.Sc.
Directing Editor

NORMAN A. JOHNSON, B.T.C.
Managing Editor

MYRON D. REESER
Advertising Manager

Official Publication of the Proceedings of the American Association of Textile Chemists and Colorists

APRIL 10, 1944

VOLUME 33 NUMBER 8

American Dyestuff Reporter, Vol. 33, No. 8, Apr. 10, 1944. Published every other Monday. Copyright, 1944, by Howes Publishing Co., 440 4th Ave., New York 16, N. Y. Domestic subscription, $5.00, Canadian, $6.00, Foreign, $6.00. Entered as second-class matter, Nov. 6, 1919, at the New York, N. Y., Post Office, under the act of March 3, 1879.

Contents

Contents of previous issues can be found by consulting the Industrial Arts Index at your library

• Departments

Trade Notes—New Products 173

• Proceedings of the American Association of Textile Chemists and Colorists

Calendar of Coming Events..... P157

The Post-War Outlook for the American Chemical Industry P158
Dr. Walter S. Landis

Substantivity and its Role in Textile Processing... P164
Dr. Anthony M. Schwartz

Corrections Re 20th Anniversary Meeting, Piedmont Section P169

Biographical Sketch of the Late Professor Charles Stebbins Doggett P169

Intersectional Contest, New York Section..... P170

Membership Applications P171

Change in Meeting Date, New York Section..... P172

Copyright, 1944, Howes Publishing Co., Inc.

Color Formula for '44

IN THIS CRUCIAL YEAR of war . . . the textile industry faces three major problems. 1. To complete requirements for the armed services. 2. To supply a still larger quantity of goods for civilian needs this year . . . while *maintaining* quality. 3. To plan for the postwar future.

The program here at Calco is closely integrated to achieve all three objectives in serving our customers. Daily production of dyes hews to an undeviating policy: The best dyes that money can buy. And this policy is realistic—not lip-service. Calco dyes remain the industry standard—for "money-value."

In addition, the Calco research and application laboratories have a full schedule. They are answering the day in and day out questions on dye applications for optimum results . . . with the speed that current production schedules require. Simultaneously, the laboratories are engaged in a comprehensive study of improvements in dyes for the postwar market.

Your Calco representative will bring each new development to your attention personally . . . as soon as it is made available.

NEW YORK • CHICAGO • BOSTON
PHILADELPHIA • PROVIDENCE • CHARLOTTE

PROCEEDINGS OF THE

American Association of Textile Chemists and Colorists

APRIL 10, 1944

Officers of the Association

WILLIAM D. APPEL, *President*
National Bureau of Standards, Washington, D. C.

HUGH CHRISTISON—CHARLES A. SEIBERT, *Vice-Presidents*

WILLIAM R. MOORHOUSE, *Treasurer*
National Aniline Division, Allied Chemical & Dye Corp., Boston, Mass.

HAROLD C. CHAPIN, *Secretary*
Lowell Textile Institute, Lowell, Mass.

LOUIS A. OLNEY
President Emeritus and Chairman of the Research Committee
Lowell Textile Institute, Lowell, Mass.

COUNCILORS

Representing Sections

ALLISON R. FLETCHER; BEN VERITY (Rhode Island)
JAMES P. CONAWAY; ARTHUR E. JONES; JOHN F. McCOY (Philadelphia)
KENNETH H. BARNARD; J. ROBERT BONNAR; J. ERNEST MEILI; GEORGE A. MORAN (New York)
JOHN N. DALTON· HARRY M. HARTNETT; CHARLES H. A. SCHMITT (N. New England)
C. NORRIS RABOLD; R. E. RUPP (Piedmont)
ROBERT W. PHILIP (South Eastern)
JACK ANDERSON (South Central)
HERBERT W. TETZLAFF; ARTHUR T. BRAINERD (Midwest)

Past Presidents

ELVIN H. KILLHEFFER; P. J. WOOD; ROBERT E. ROSE; WILLIAM H. CADY; ALBAN EAVENSON; CARL Z. DRAVES; THOMAS R. SMITH

Local Sections and Their Officers

Northern New England Section

Edward S. Chapin, Chairman, W. C. Durfee Co., Inc., 114 Federal St., Boston, Mass.
Azel W. Mack, Secretary, Hart Products Corp., 176 Federal St., Boston, Mass.
Delbert E. Ray, Vice-Chairman; George O. Linberg, Treasurer.

Rhode Island Section

Howard V. King, Chairman, 103 Albert Ave., Edgewood, R. I.
Robert W. Joerger, Secretary, Institute Lane, North Scituate, R. I.
Harold B. Sturtevant, Vice-Chairman; Robert R. Farwell, Treasurer

New York Section

Patrick J. Kennedy, Chairman, E. I. du Pont de Nemours & Co., Inc., 40 Worth St., New York, N. Y.
Norman A. Johnson, Secretary, American Dyestuff Reporter, 440 4th Ave., New York, N. Y.
Emmett Driscoll, Vice-Chairman; Edward H. Schmidt, Treasurer

Philadelphia Section

Boyce C. Bond, Chairman, 10 Meredith Road, Overbrook, Philadelphia, Pa.
A. E. Raimo, Secretary, John Campbell & Co., S. E. Corner Broad and Spring Garden Sts., Philadelphia 23, Pa.
Arthur W. Etchells, Vice-Chairman; Curt R. Baeringer, Treasurer

Piedmont Section

Henry B. Dixon, Chairman, May, McEwen, Kaiser Co., Burlington, N. C.
Leland G. Atkins, Secretary, Southern Dyestuff Corp., Charlotte, N. C.
Sidney M. Cone, Vice-Chairman; Wyss L. Barker, Treasurer

South Central Section

Homer Whelchel, Chairman, Central Franklin Process Co., Chattanooga, Tenn.
R. W. Freeze, Secretary, American Aniline Products, Inc., 2202 Chamberlain Ave., Chattanooga, Tenn.
J. A. Crumley, Vice-Chairman; W. K. Newman, Treasurer

Midwest Section

Virgil T. Hartquist, Chairman, Wayne Knitting Mills, Fort Wayne, Ind.
Louis Hoehn, Jr., Secretary, Nyanza Color & Chemical Co., 549 West Randolph St., Chicago, Ill.
George E. Osha, Vice-Chairman; Alfred J. Olson, Treasurer

South-Eastern Section

O. G. Edwards, Chairman, Avondale Mills, Sylacauga, Ala.
W. B. Griffin, Secretary, Kali Manufacturing Co., 939 Highland Terrace, N. E., Atlanta, Ga.
J. E. Smenner, Vice-Chairman; Laurie E. Whittelsey, Treasurer

Lowell Textile Institute Student Chapter

Carmelo R. Puliafico, Chairman; Paul J. Martin, Secretary

North Carolina State College Student Chapter

William R. Ivey, Jr., Chairman; James F. McAlister, Secretary

Philadelphia Textile Institute Student Chapter

F. J. Lorent, Chairman; S. M. Suchecki, Secretary

New Bedford Textile School Student Chapter

Helen E. Brooks, Chairman; Charles T. Allen, Jr., Secretary

CALENDAR OF COMING EVENTS

Meeting, Philadelphia Section, Hotel Philadelphian, April 14, 1944. Speaker: Charles A. Seibert, Organic Chemicals Dept., E. I. du Pont de Nemours & Co., Inc., "Effect of the Fiber pH on the Light Fastness of Dyed Cotton."

Meeting, Council, Downtown Athletic Club, 19 West St., New York City, April 21, 1944.

Meeting, New York Section, Downtown A. C., 19 West St., New York City, April 21, 1944. Speaker: Henry F. Herrmann, General Dyestuff Corp., "Dyes and Chemicals in Post-War Planning."

Meeting, Research Committee, Chemists Club, 52 E. 41st St., New York City, April 22, 1944.

Meeting, Southeastern Section, Atlanta Athletic Club, Atlanta, Ga., April 22, 1944. Speakers: Donald J. Campbell, Electrochemicals Dept., E. I. du Pont de Nemours & Co., Inc., "Continuous Peroxide Bleaching"; C. A. French, Industrial Heat Engineering Co., "High Temperature Drying with Infra-red Radiant Energy."

Meeting, South Central Section, June 16, 1944 (Tentative).

Meeting, Southeastern Section, Callaway Institute, La Grange, Ga., September 9, 1944 (Tentative).

The Post-War Outlook for the AMERICAN CHEMICAL INDUSTRY*

DR. WALTER S. LANDIS

Vice President, American Cyanamid Co.

THE chemist often assumes the date of transition from the chemical art to the chemical science, as approximately the middle of the 17th century—that is almost three hundred years ago. We must not, however, think that all chemistry dates only from the beginning of the scientific era. Chemical reactions have been taking place as long as there has been a universe. They occurred long before the so-called creation, long before there was life on this earth. Matter as represented by the elements was shifting its combinations as the mass of gases cooled and permitted the establishment of new equilbria. Similar reactions are going on everywhere today.

Undoubtedly the culmination of this reactivity was represented in the creation of the first living creatures, for the chemical structures of the plants and the animals are the most complex of all. Even the simplest of living creatures, the Protozoa, carry on intricate chemical reaction in the transformation of food into their body structure, and of such complication that it is beyond our ability to reproduce in our most highly developed laboratories.

Man has always been associated with chemical reactions. His own body is a great chemical factory carrying on a multitude of chemical operations. He sees them going on about him in every day life. He learned through accident or otherwise to conduct chemical processes to meet some of his specific requirements not directly provided for by nature.

Thus there has always been a chemistry, and today there is hardly an object that you come in contact with throughout the course of your day's activities, that is not the result of a chemical treatment, or the contribution of a chemist, all this in addition to what nature herself is doing in the chemical field. Our science and our industry, and the preceding art, is responsible for a great increase in our standard of living, and we chemists will continue to contribute more so long as there is a human race in existence. There is no completed job or finality or limit ahead of us. We are really just starting to understand the fundamentals and the principles of our science, and contributions from our shops and our laboratories will continue to appear in ever increasing numbers.

*Presented at meeting, Northern New England Section, January 28, 1944.

EARLY HISTORY OF THE CHEMICAL INDUSTRY

We do not have very good records of the first man-engineered chemical reaction. Many of the products were transitory and disappeared through weathering during the ages. But we do know that man conducted many metallurgical operations long before written history. We commonly speak of the Bronze Age because we find much bronze, an enduring alloy, in the archaeological excavations. Nature does not supply bronze as such, though she does contribute copper in metallic form. Our earliest metallurgists, therefore, must have learned the art of smelting copper and tin ores, or of copper, tin and zinc ores. Then there is an Iron Age. Nature does not supply iron in elemental form and man had to learn to smelt it from its ores. These ores are more abundant than the ores of copper, and the smelting of iron may have preceded that of bronze. Since iron is not so enduring, we usually regard the Iron Age as later than the Bronze Age,—possibly an error.

The first description of a chemical reaction that I recall is mentioned back in the book of Exodus where a little argument occurred between the Egyptian masters and their slaves, the Israelites, concerning the making of brick and the allocation of straw. Today we recognize that is an important application of colloidal chemistry.

The Old Testament mentions the metallic elements, gold, silver, copper, iron, lead and tin. Three of them could only have been derived by smelting of ore, that is through a chemical process. The large amount of copper possessed by the Ancients can hardly be explained by the available sources of native metal. This books also mentions the coat of many colors which caused so much trouble in the family of Joseph, and again in many other places, of robes of scarlet and purple, showing that there was a dye industry in existence. The leavening of bread and the reference to wine tells us that the fermentation industry was understood. And then we have learned from other sources of knowledge, that glass was produced and in many colors in contemporary times. I might continue this early history at great length by reporting many other chemical operations.

The Egyptians undoubtedly were skilled chemists in the sense that they had developed over the many centuries an art which passed down from one to the other. The

Egyptian word "Chem" meaning the black art, is undoubtedly the root of our modern word chemistry, although we sometimes assign this credit to the Greek "Chemeia" which probably was derived from the Egyptian. Undoubtedly the Egyptian priests of the Temple were familiar with many of these chemical operations, professional secrets as it were, and which explain the origin of the Egyptian word.

The Greeks paid a great deal of attention to the preparation of medicinal compounds, for the medical profession was in high standing in their part of the world. The Greek philosophers considered chemical reactions and even attempted to explain the several combinations of their four elements, earth, air, fire and water, to make the material world about them. They had even arrived at a very crude idea of what 2,000 years later was rediscovered as our modern atomic theory.

This art of the Egyptians and the Arabians and the Greeks passed up and down the Mediterranean, spread through Africa and Europe, adding new knowledge and new compounds as practice made more perfect. About the beginning of the Christian era it was of such importance that treatises on chemistry began to appear, summing up the status of the knowledge of the art as of that time.

For the first 1600 years of the Christian era, the chemical operations belonged wholly to the class of *art*. There was no systematic approach to the subject throughout these years of alchemy. The alchemist simply mixed everything together, fused and boiled and extracted and distilled and crystallized, in the hopes that something useful would result. He passed his knowledge largely by personal contact to his immediate contemporaries, though from time to time he made cryptic notation of his procedures. He was looking for the Philosopher's Stone through the medium of which he hoped to transform base metals into gold. As a side line he also sought the Elixir of Life which would prolong life indefinitely. A large number of people were engaged in this alchemistic research, if you can call it that, and they produced a long catalogue of materials, some for medicine, some for other utilitarian purposes. There was really a surprisingly large amount of unclassified knowledge accumulated during this period and many of the chemical compounds of wide use today can be traced back to the discoveries of the alchemists.

We have alchemists with us today who still conduct their operations in much the same way. We even have people in high Governmental places who believe we are still in the alchemistic age and are atetmpting to legislate us out of it. I refer to the opening paragraph of the Kilgore Bill. They do not seem to have discovered that the world has moved forward in the past thousand years, and that a real science has replaced the ancient art.

The chemistry of the Middle East had spread over the greater part of Europe, and no one country possessed any considerable monopoly or any great advantage in this growing industry. The alchemists were in all countries, crude manufacture was carried on throughout Europe, meeting the demands for the small quantities of materials required under the then existing standards of living. Acids, alkalis, soaps, paper, and many chemical salts were produced in many countries, as well as a well developed metallurgy. The dyeing of textiles, the tanning of leather were really very highly developed arts. The ceramic field had long been exploited, colored glass and ornamental tile of great perfection resulting.

THE FOUNDATION OF MODERN CHEMISTRY

Then came the revolution in the middle of the 17th century—the foundation of our modern scientific approach to chemistry. The vast accumulated knowledge of the centuries was collected, correlated, and the many existing philosophies and theories were reviewed, and their inadequacy established, and out of all this came a real science. Many of the chemical elements, as we know them, were identified and their properties noted. Laws of combination and of the behavior of gases, were formulated and tested against the observed facts, and the old art slowly made way to the new science.

Science is never finished with its development. It tests each new theory and if found lacking with respect to the aggregate of fact, revision to meet the new conditions follows. As we expand our fundamental knowledge we penetrate with even greater speed into the realm of the unknown, and conquer at an ever increasing rate. That is the story today. Each decade shows progress in geometric ratio to that of the preceding. As we improve our observation and our equipment and measure more precisely so do we move more rapidly. We need never worry about having conquered the last area of the unknown for the horizon keeps ever slipping away. There is no limit to the field of scientific conquest.

A real manufacturing chemical industry began in England, France and Germany, the English being predominant in this field in the early days. It spread over into the United States as the colonies developed and the young nation was on its way. This American industry was largely founded upon English practice. The products made were crude, principally acids, alkalis and salts, now recognized as foundation stones of the heavy chemical industry. Germans also became interested in these chemical developments though not contributing any particularly noteworthy methods or products. However, those guiding the German States recognized their lack of native raw materials and foresaw that the chemical industry offered a possibility of greatly improving the industrial status of a country so situated. Germany began to pay particular attention to education in the chemical science and her politics and state-craft were directed to furthering the development of this industry, which held the promise

of converting raw materials of cheap and plentiful nature into finished products of greatly increased value, through the assistance of an intelligent and informed worker. Her schools began to emphasize chemistry and soon took a foremost place in the world of chemical education. She seized upon development work coming out of laboratories all over the world, converting these crude ideas into practicable manufacturing processes. Her chemical people emigrated to some small extent to other countries, America among them, bringing with them German knowledge and experience for starting a new industry. Thus there are many German names found in the early American chemistry, for example, Rosengarten, Mallinckrodt, Klipstein, Hasslacher.

Our American chemical industry included a group of English and Scotch chemists, some of them educated in German Universities; Swiss and Belgian chemists, also with a German educational background. French, Dutch and Italians in lesser numbers contributed to this early development of chemistry in America.

More and more American industry turned its attention to the heavy chemicals, developing plants and equipment suited to large scale manufacturing under American standards, and out of which came by far the largest producing units in the world. Much less attention was paid to the fine chemicals, the organics and the dyes, this branch more and more concentrating in Germany and her border-line provinces and states. Later on this development of a one-sided chemical industry proved to be a serious economic and industrial error.

To repeat, America was foremost in the production of heavy chemicals with relatively small units producing dyes and pharmaceuticals and other high purity products. Germany was pre-eminent in the production of the organics, dyestuffs and pharmaceuticals. She had built up her educational institutions, strengthened her facilities in these specific fields of chemistry. It is true that in the production of these fine chemicals, acids, alkalis and other auxiliaries are needed, and while the German units were efficient, they were relatively small. England was still the larger exporter of the heavy chemicals.

The Government of Bismarck had pointed out to the German nation that the country was poor in raw materials but rich in manpower and in intelligence. Germany would, therefore, find her place in the world by devoting her attention to those fields of activity designed to convert cheap raw materials into the more expensive products. In the mechanical field such include machine tools and instruments of precision. In the chemical field these were the processes that used cheap materials like benzol, toluol and the like and converted them into the high priced pharmaceuticals, dyes and organic chemicals. Thus Bismarck declared that the German people could make the best use of their talents, and every means was taken to insure the success of this program. Germany did dominate the field of scientific apparatus, of optical equipment, of fine chemicals up until the last war.

EFFECT OF WORLD WAR I

The war, however, painfully demonstrated to the world at large that many of these products were essential to the production of a vast number of consumer goods. The lack of a little dye could wreck a textile industry. Shortage of pharmaceuticals could endanger the health of a nation. The industrial countries most hurt by the war began production in these fields that were formerly almost exclusively German, and following the end of the war this development has since been carried to great lengths. In England the chemical industry was amalgamated, the dye and organic division was built up, and we have the great ICI unit as a result. In order that this unit might live, England excluded imports of materials that might interfere with its development.

In France the Kuhlmann group expanded enormously. True, this devoted most of its attention to the heavy chemicals but it did have its organic adjuncts.

The Montecatini group in Italy assembled most of the chemical industry under its control and it too built a dye and organic department.

Even the Swiss who were not a part of the war, developed two or three rather large companies from relatively small pre-war beginnings. Having no raw materials they too paid a great deal of attention to fine chemical production.

In this country no such complete corporate combination was possible. Here the larger representative units in the industry began to absorb the several small independent companies that started production of a few specialties during the war. In due course, a number of companies became important in this organic field, and today, again in the middle of a great war, we hear of no shortage of chemical products other than that incident to demands far beyond peace-time capacity to produce.

There has been no question of the know-how, of the engineering, of the supervision, of the direction. It has been wholly a question of obtaining the necessary machinery and equipment to expand in the many directions that the war necessitates. Our chemical industry has met every demand, subject only to limitations which affect all industry, that is of plant and manpower. It has not failed because of lack of knowledge.

World War I also brought about great revision in the educational facilities in this country. We too reconstructed our facilities in our institutions of learning. We added something that the Germans had not developed, that is, the idea of producing a chemical engineer. We are exercising constant supervision, through our Technical Societies, over the quality of our education, the facilities available, and have given meritorious distinction to those institutions that qualify. There is no longer necessity

to study abroad in any of the chemical fields for we have the European equal available in many of our educational institutions.

After the close of World War I, Germany never was able to regain the position she once occupied in the fine chemical industry. She had to seek markets in competition with the new production units in those few parts of the world not chemically minded. These markets were greatly restricted compared with what she had enjoyed up to the outbreak of World War I, and I have always believed that the loss of this export chemical business to Germany would play an important part in the generation of a new war. You feed a population or you fight them. Germany depended upon the exchange of her dyes and chemicals for a considerable portion of her food and textile raw material supplies. She had no substitute ready to take the place of these forever lost chemical markets.

PRESENT CONDITIONS

Upon such a foundation the present war has relied for its enormous producing capacity of all the thousands of products that use chemicals somewhere in their manufacture, not to speak of explosives, motor fuels, rubber substitutes, and the like. We had built solidly since the first World War ended. Not only have we educated chemists and built plants, but we have also raised the standard of publication in the chemical industry to a point where we have journals, an abstract service, and a literature that has no parallel in the world. Anyone who speaks of the chemical industry as having unassembled and uncoordinated information, just does not know what he is talking about. Yet that exact language is very prominent in legislation now being considered in Washington. Except for a few compendiums and tables of data all is in English. The demand for translations has never been great, and language difficulties are not serious in the chemical industry. There are American texts in all chemical fields and it is only in the rarest of circumstances that reference to an original foreign publication is now necessary.

The industry is again facing a new geographical division. We are again in the midst of a great World War. In the generation that intervened between these two world catastrophies, there has been much industrial development in many countries in the world. These infant industries demand some chemical supplies and these were imported. Again a World War has interrupted all international trade, and these local industries are suffering shortages of chemicals. In these new industrial countries, a chemical industry is now being developed, not only to make the common and heavy chemicals, but also to make some of the larger tonnage synthetics. These lesser nations cannot afford to have their domestic economy upset every time some foreign country decides to go on the rampage. You may be sure they will promote and protect this infant chemical industry that is now under construction, and again there will be a new economic balance in the chemical world. Again Germany will lose, so will England, so will America, in these export markets. These are the prices the politicians never recognize when they plan military excursions. The penalties that ensue are never anticipated. They do not recognize that markets may be lost forever, for around these infant chemical units will grow a host of secondary ones, for that is a natural evolution of industrial chemistry:—crudes, intermediates, finished products—the branches become as numerous as the leaves on the tree. Once started, expansion becomes relatively easy.

For example, China possessed a very small chemical industry when the Japs started to over-run the country. Some of these plants were destroyed. Some of the equipment was moved back into the country and set up again. Additional equipment has been brought in with great difficulty. Undoubtedly a chemical industry will arise just as soon as hostilities end and equipment can be acquired in a more logical way.

India has gained great impetus in her industrialization in the last few years. A significant part of this development is chemical in character. I am quite certain that, if opportunity presents, at the close of the war we shall see an important chemical industry in that country.

South Africa had a very small industry producing alkali, chlorine, acid, alcohol, commercial explosives and fertilizers. With the relatively small population and vast mining development, the Union suffered from lack of many of her imported chemical supplies. This country too has turned to and has greatly increased the scope of chemical production which will not be abandoned at the end of the war, for this country has always protected its home industries to the extreme.

The Latin American countries to the south of us are all interested in meeting their demand for chemical products. Mexico has always had a textile industry and is greatly increasing this, both in magnitude and variety. Here too a chemical program is being developed. Our trade papers tell us that Chile is also embarking upon a chemical manufacturing program and has taken one of our American experts to advise her. Argentine has been in chemical production and is also increasing facilities. Brazil has gone into it in a big way.

Australia has paid attention mostly to the metallurgical field and the war has forced some rather important developments in the electrochemical field. At the present time there are under consideration a number of chemical units for this distant state.

FUTURE CONDITIONS

I do not know what the result will be a generation from now. I do not know where the center of the chemical industry will be located. Perhaps there may be no one outstanding center, for once the great populations of Russia, China

and India determine upon raising their standards of living, they too are going to have their own chemical industry and in time these may outrank ours, just as we have for years surpassed the Germans.

Science has the peculiar faculty of carefully systematizing its records of progress. It records its observations and methods. As a result every new student enters the field richly endowed with all the lore of past years. A few short years of schooling in fundamentals to understand the jargon and the elemental principles, fits one to proceed on his own. It is an open field of infinite breadth and one in which he quickly catches up to his predecessors. One cannot discount the fact that any of these countries that we call backward can assemble many of these foundation stones upon which such a start can be made. The disorganized state of the world aids in acquiring the personnel and direction. The physical equipment of the laboratory is relatively small in amount. The whole lore of the ages may be acquired in carefully compiled documentary form. It is not an impossibility to conceive that competent political direction in the establishment of schools, laboratories, libraries, can create the fundamental know-how of an industry in a relatively short period of time, as time runs in this world. The problem of capital for tools for large scale production, is another matter. The financial problem may be more difficult than the educational one, but even that is surmountable, for we ourselves are now experiencing the growth of an enormous producing plant here in America which is built on credit, taking in each other's washing, as it were.

But I do not want to scare you with more of this analytical rambling. I do not want you to think for a moment that we are going to be swamped or overrun tomorrow with chemical imports from these today's undeveloped parts of the world. The politician still stands in their way and it is only in the most exceptional examples that his intelligence goes so far as to further such a program as I have hinted at. Bismarck may have built a great chemical industry, but it was wrecked in a comparatively few years by a successor politician. There is no second Bismarck in sight now.

I would not worry too much about this post-war geographical redistribution of the manufacturing chemical industry. There is nothing we can do about it for no country can permit its logical home industries to collapse for the want of a few cents worth of chemicals. It must add some local chemical manufacture to support its industrial developments. It is true there will be decreasing opportunity for export of the most elementary chemical products. This in turn is offset by industrial development calling for imports of the more complex consumers goods, which naturally America will supply to the greater part of the world. These will permit utilizing the products of our chemical industry that may not be exported in their raw state.

As to the chemical industry here in America in post-war days, it follows closely the activity of all other industries. If one were to plot the Federal Reserve Bank curve of industrial activity and the Chemical Industries index of industrial activity, he will find that one is the exact counterpart of the other. In other words American chemical activity is exactly parallel to all production activity. There is no reason to believe that this will not follow in the post-war period, for no new economic factors have appeared that will change this relationship.

We are told that there is a large inflationary gap, that is, money ready to be spent for the products that were not available because of the diversion of manufacturing industry to munition production. On the face of it, therefore, there will be an important demand for goods as soon as these become available. We can all hope that this demand can be repressed until manufacturing is resumed, for otherwise there may be very serious consequences. I believe that business now recognizes this situation and will lend its aid to a control of this pent-up purchasing desire. Intelligent handling on the part of Washington is another matter, for Washington has not shown aptitude in that direction. Washington is too concerned with an election this Fall, and tempers far too much of its action to the political wind. It is most unfortunate that our economic future is so warped and twisted by the vote-getting motive.

I believe that we will find the means of breaking this political strangle-hold and getting peace-time production under way in the not too distant future. As to what may be expected in the chemical industry, is a difficult prediction because so many things can happen between tonight and the real beginning of conversion. I can only say that there are no stocks of chemicals hanging over the market except drugs and pharmaceuticals. Of course, this situation can change if plants are kept operating longer for political reasons than actual military necessity requires. There is much evidence that this is likely to happen but there is absolutely no real reason why chemical units should not be slowed down as materials accumulate. I am, therefore, hopeful that with the assistance of the industry we can avoid piling up great stocks of chemicals in the hands of the Government.

As the situation appears today it looks to me as if the chemical industry will average a production index of about 30 per cent more than in 1939, for the first twelve months after hostilities have ceased in Europe. The industry will be ready to produce at this rate long before many of its customers have converted.

The only disturbing situation is that in the drug and pharmaceutical lines which may find themselves in some difficulty unless the Government can be persuaded to use more sensible ideas of disposition of Government surplus stocks than was exhibited at the close of World War I.

I am certain that you will question why I have not spoken of new developments. The chemical industry is always bringing out new developments. It does not operate on yearly models. Therefore, against a background of this type of development the so-called new things will not make any large change in our industry. They will come along just as they always have and will find their logical place. It will not be a revolution in any sense of the word.

I think we are all misled by the great amount of propaganda on these revolutionary changes in industry that floods our desks. The big problem is to get the people back to work at the earliest possible date and in the greatest possible numbers. The only way to do that is to make the things that we were working on last. The public is hungry for goods and they are not going to be too particular as long as perfectly serviceable materials are provided. Therefore, for the next several years, I do not expect to see great revolutionary changes take place in our industry. Over the long period we will follow our usual custom of marketing the new things that come out of our research laboratories just as fast as they are ready. We will continue our service to the public in the same manner that we have in the past. (Applause.)

DISCUSSION

Chairman Chapin: Dr. Landis, can you tell us a little about what you consider the Russian factor on this post-war chemical situation?

Dr. Landis: That is a very, very difficult question to answer in a few words. The Russians were good chemists in days gone by. Many important developments have come out of Russia, quite as many fundamentals as ever came out of Germany, but the difficulty was that about 1919 the Russian craftsmen that produced those chemical developments were liquidated by the Revolution. Few people recognize how completely the Russian Revolution eliminated the intelligentsia. They disappeared. Since the Revolution Russia has attempted to build a new chemical industry with no background, no education in the great mass of people. We know you should have two or three generations of education and until you have such background, very little can be done in the line of advanced technical training. But in spite of this Russia undertook to build a chemical industry in the first five year plan and the second five year plan. It is very difficult to find out just what has resulted. Few people who have gone to Russia have seen much of the chemical operations. There is plenty of broken-down equipment and in general they are described as inefficiently conducted operations from our point of view.

That has been confirmed in the present war. The Russians with all their vast man-power could only retreat largely because of lack of technical supplies of every kind. Once the Allies opened a couple of sea roads, then the war turned the other way.

Considerable literature is coming out of Russia but it must be examined carefully. The Russian language is very difficult, but some of their publications are in German and some in French. Also in English. My own experience is that it is not high grade material. Much is a new dressing of what we have long known and the new contains only a few odds and ends not of great importance. The Russians have no running start in the chemical business—if that answers your question.

A Member: Dr. Landis, I noticed that a publication from the War Production Board mentioned there had been about a 180 per cent increase since 1939. That may not be exactly right. If you figure there is only going to be 130 per cent production against that of 1939, after the war is over, that means a drop of practically 25 per cent. Have we got to look forward to that?

Dr. Landis: I think so. The Chrysler Plant, which is turning out a rather large number of anti-aircraft guns, expects to see a drop of 100 per cent in production one of these days. We have built more synthetic ammonia capacity than was consumed before the war, so we have a 100 per cent surplus there. I think one million tons of sulfuric acid production capacity went to the Middle West where nobody will want it. Just as machine gun and tank production will drop 100 per cent, so will explosives figure a similar reduction.

John Dalton: You read about the coming plastic age. What effect do you think plastics will have on the metal industry?

Dr. Landis: Are there any metal men here? Some of you textile men give me some history. When was wool first used as a material for clothing?

The Chairman: You quoted from the Bible; it's in there.

Dr. Landis: I think that wool came before cotton. I think wool was the natural consequence of first animal skin and then our ancestors figured it would be a little smoother to take the rawhide from behind the wool. Then cotton came, but I think we are still using a little wool in this Country. A material came along a couple of centuries or more later, known as "rayon." Are we still doing any wool or cotton business in this Country? You see you answer your own question in your own industry and I don't have to know anything about the industry.

If I were to believe some of the literature I see, we are not going to make a ton of steel or aluminum because plastics are going to supplant all. Anyway, that is the way I read the literature. Do you think the United Steel Corporation is going out of business? Do you think the Aluminum Corporation is going to give up without a scrap to the plastics industry? I don't. They have all a place; they are going to find that place and, believe me, they are going to fight like hell for it. (Laughter)

(Concluded on page 169)

SUBSTANTIVITY

and Its Role in Textile Processing

DR. ANTHONY M. SCHWARTZ
Research Director, Alrose Chemical Co.

SUBSTANTIVITY is a term widely used by textile technologists but seldom given a precise definition. It is used to connote the affinity of a dyestuff or other finishing substance for a fibrous material, in particular the affinity as measured by fastness to water-washing or soaping. It first came into general use to characterize the series of water-soluble colors which dye cotton without previous mordanting. Sometimes textile chemists will refer to the substantivity of a dye to wool or to acetate rayon. Originally, however, the term applied only to cotton and the vegetable fibers. For purposes of discussion, I am going to define the substantivity of a material simply as its affinity for celluose in the presence of water.

The first substantive dye, Congo Red, was discovered by Böttiger in 1884. Within a very few years after that, many other substantive dyes had been prepared, and the practical dyer had a fairly complete line of direct dyeing colors at his disposal. The dyestuff chemists, however, were greatly puzzled as to why these new dyes adhered to cellulose, whereas other azo dyes of very similar structure had no affinity at all. At that time very little was known about the physical chemistry of adsorption phenomena (of which dyeing is one example). The practical value of direct dyes stimulated an enormous amount of research along these lines. Today a great deal more is known about what actually happens during dyeing, and a large group of seemingly unrelated phenomena connected with cellulose affinity can be tied together.

This evening I would like first of all to review briefly the nature of cellulose affinity, the mechanism of dyeing, and the affinity of the water-soluble direct dyes. This subject has been well worked out in recent years and ably presented on many occasions, so it is now generally familiar. We shall then consider the affinity of the water-insoluble dyes (of which the vats and naphthols are typical). Thirdly, the relationship between the substantivity or affinity of dyes and the adhesion of finishing materials to the surface of the fiber; and finally some of the practical developments we may expect in the future, as a result of current research and knowledge of cellulose affinity.

To get a good picture of how substantive materials become attached to cellulose we must first consider the fine structure of the cellulose fiber itself. A typical dry cotton fiber or rayon filament may be considered as roughly cylindrical in shape and about .02 mm. or 1/1250 inch in diameter. It is not a homogeneously dense structure (such as, for example, an inorganic crystal) but is interlaced with submicroscopic irregular crevices and pores. These pores are of molecular dimensions. Their average size is estimated as equivalent to a circular opening of 5 to 10 Å or about 1/30,000 of the diameter of the fiber. (There are 10,000,000 Å in one millimeter.)

When the fiber is immersed in water it swells, imbibing 20 to 50% of its weight of water depending on the type of cellulose. The diameter of the fiber increases greatly during this process, although the length increases very little. The pores become greatly enlarged and now average about 50 to as much as 200 Å. This is still far below the range of visibility, even under the highest power microscope. At 1000 diameters magnification, a particle of 5000 Å would appear about the size of a pencil dot. The water can diffuse through the fibers freely. In the case of cellophane, water diffuses more readily in the thickness direction than in the longitudinal direction. Similarly, in a rayon fiber it probably diffuses more readily in the radial direction than in the lengthwise direction. The whole swollen structure bears a negative charge (probably due to carboxyl groups in the cellulose) and is capable of base exchange reactions, that is it can adsorb positively charged ions such as H^+, Na^+, Ca^{++}, etc. The pore walls are composed of the cellulose molecules themselves. In some regions these thread-like molecules are randomly arranged, i.e., the structure is amorphous. In other regions they are oriented with respect to each other, forming crystallites. The exposed portions of these molecules are as available for chemical or physicochemical action as if they were existing independently in solution. They have a strong affinity for water, and the layers of water molecules closest to the pore wall are in a highly condensed state. The water and cellulose molecules are held together by secondary valence forces, a point which we shall consider later in more detail.

A dyestuff or other solute dissolved in the water is free to enter the pores by ordinary diffusion, *provided the*

* Presented at meeting, Rhode Island Section, January 28, 1944.

diameters of the ultimate particles of solute are appreciably smaller than the pore openings. With molecularly dispersed solutes, this is usually the case. As typical examples, we have the simple inorganic salts, such as NaCl, and also water soluble organic molecules, such as glycerin or ethanol. These can diffuse freely through water-swollen cellulose films or filaments. The same holds true for most of the acid dyes since these usually exist in water as molecularly dispersed solutes. Many direct dyes exist in aqueous solution mainly in the form of colloidal aggregates too large to penetrate the pores. These aggregates are of various sizes, and tend to break up progressively into individual molecules with increasing temperature. The individual molecules can then enter the pores. This is one of the reasons why the more colloidal direct dyes require a higher temperature of application.

During the dyeing process, the dye molecules diffuse into the fiber pores and inevitably collide repeatedly with the pore walls as a result of their random thermal motion. If the dye molecules are of such a nature that there are strong affiinity forces between them and the cellulose molecules, they will tend to stick where they hit and remain held in place on the pore wall. If the affinity forces are negligible, the dye molecules will rebound from the collisions and continue on their irregular diffusion path.

Let us now consider briefly the nature of these affinity forces which operate between substantive dye molecules and cellulose molecules. The forces which tend to hold any two molecules together are generally known as secondary valence forces or Van der Waals forces. They are distinguished both quantitatively and qualitatively from the primary valence forces which are responsible for holding atoms together within a molecule. The secondary valence forces, for example, are responsible for holding the molecules of a liquid together and preventing it from vaporizing into a gas. In general they are the forces operating in the cohesion of matter. They act to a greater or lesser extent between any two molecules, and their *magnitude depends on the chemical nature of the molecules.* They do not act at any appreciable distance. In other words, the two molecules must *collide* with each other before the forces come into play. Two molecules will not be attracted toward each other from a distance by these secondary valence forces; but in order to separate two molecules which have come together by collision, the secondary valence forces must be overcome.

The secondary valence forces which play a dominant role in dyeing are those operating between: 1. cellulose-water, 2. cellulose-dye, 3. dye-water, 4. dye-dye. The dye-water forces and the dye-dye forces are responsible for the solubility or lack of solubility of the dye. If the dye-dye forces are fairly large, but not large enough to cause complete insolubility, there is a tendency to form colloidal aggregates in the solution. Many direct dyes belong in this category.

In order to have substantivity the cellulose-dye forces must be quite strong relative to the dye-water forces. The cellulose-dye forces are almost always considerably weaker than the cellulose-water forces, but in the case of substantive materials they are at least strong enough to displace part of the water from the cellulose. Thus, most of the points on the cellulose molecules which are available for secondary valence attachment will be occupied by water molecules. A certain proportion of them, however, will be occupied by dye molecules. For practical purposes, this proportion does not usually have to be very high. 1-2% dye on the weight of the cellulose may give a strong color, while the cellulose can at the same time take up ten or more times as much water as dye. Since the secondary valence forces do not act at a distance, it is obvious that good dyeing can only be obtained if the dye molecules come into close contact with the cellulose molecules. Hence, the fibers must be thoroughly boiled out and cleaned before the dyeing operation. The above is a simplified picture of what probably occurs during dyeing. Actually, all the forces and actions are in a dynamic equilibrium and never go 100% one way or the other. If a dye is soluble at all, that means that the dye-water forces have a definite *positive value,* and no matter how strong the cellulose-dye forces are *some* of the dye will remain in solution at the equilibrium point, rather than being all adsorbed on the cellulose. That is why we cannot obtain complete water and wash fastness with a soluble dye. The various after-treatments designed to make direct dyes faster to water all involve a weakening of the dye-water forces (i.e., decreasing the solubility of the dye) without altering the dye-cellulose forces. As typical examples we have: 1. The formation of insoluble salts of the dye by treating with heavy metal compounds or high molecular weight organic bases. 2. Treatment with formaldehyde, which in some instances condenses two dye molecules together to give a single molecule of twice the molecular weight and much lower solubility. In the case of developed dyes, a new dye of lower solubility is created within the fiber, chemical reaction taking place within the pores. In the new dye, the forces dye-water are low (so low we could not use it as a direct dye), but the dye-cellulose forces either remain unaltered or are increased.

The fact that the dye-cellulose forces are all-important in substantivity is amply illustrated when we come to consider the substantivity of completely insoluble materials. If we look back at the pore dimensions, it is seen that it is practically impossible to grind or colloidally disperse a solid so that the particles are fine enough to penetrate the pores. In order, therefore, to deposit an insoluble solid within the pores of the fiber, we must form it *in situ*, by the chemical reaction of soluble components which have been allowed to diffuse in. This procedure is well illustrated in the case of the azoic or naphthol dyes. The sodium salt of Naphthol AS, for example, is soluble and

diffusible, and in the grounding operation this substance is allowed to diffuse into the pores of the fiber. The fabric is then immersed in a bath of a diazonium salt which diffuses into the fiber pores. It reacts with the sodium naphtholate already present, and an insoluble precipitate of azo dye is formed.

If the resulting precipitate does not have a definite affinity for the cellulose, it will wash out of the fiber just as sand can be washed out of a sponge. Barium sulfate is a good example of a non-substantive insoluble precipitate. If a rayon fiber is immersed in barium chloride, then is treated with sodium sulfate solution, insoluble barium sulfate is formed within the pores of the fiber. This gives a whitish opaque appearance to the fiber, and has been used as a delustering treatment. On washing with water, however, the barium sulfate comes out of the fiber and appears as a finely divided sediment in the wash liquor. Similarly, it is possible to create a beautiful opaque effect on rayon or cellophane by treating with sodium polysulfide and subsequently with acid, thus depositing finely divided elemental sulfur in the pores of the cellulose. The sulfur, however, can be washed out readily with warm water, even though it is quite insoluble. Here too the sulfur appears in the wash liquor as a suspension or sediment.

If, on the other hand, a precipitate is formed within the pores does have good affinity for cellulose, an extremely wash resistant effect is obtained. The cellulose-precipitate forces are strong and the water-precipitate forces are weak (as evidenced by the insolubility of the precipitate). This effect is well illustrated by the naphthol dyes and the vat dyes. The sub-microscopic particles of dye are presumably formed in close enough proximity to the pore wall so that the secondary valence forces become operative.

In many cases we find that the substantivity of the final insoluble dye is directly proportional to the substantivity of one or more of the soluble diffusible intermediates from which it was formed in the fiber. This is particularly true when the dye is formed by a simple reaction between two components. Some of the leuco vat dyes, for example, are in themselves as substantive as many direct colors. When they are converted to the final form by oxidation, the dye-cellulose forces remain large and the dye-water forces are reduced to practically zero. The result is a color of extreme resistance to washing.

Another example of this effect occurs in the naphthol series. A fabric grounded with beta-naphthol (an intermediate of low substantivity) and coupled with diazotized meta-nitro p-toluidine, gives the well-known toluidine red, an insoluble color of mediocre wash-fastness. With Naphthol AS (of higher substantivity) a much faster dyeing is obtained. With some of the more substantive Naphthols, such as AS-SW, AS-SR, and AS-SG, the colors are still faster. Some of these more substantive Naphthols (soluble and diffusible in the form of their sodium salts) have such good affinity that they cannot be used for printing, because the whites will remain stained even after prolonged washing. Such naphthols are used in the form of Rapidogens.

A still better example is found in the yellow naphthol series. If Hansa Yellow G is precipitated within the pores of a rayon filament by grounding with alkaline acetoacetanilide and then treating with dazotized meta nitro p-toluidine, the resulting yellow color, which is insoluble, washes out of the fiber very readily. If Naphthol AS-G is used instead of acetoacetanilide, the resulting color is much faster. Naphthol AS-G is not very substantive, but it is sufficiently more so than acetoacetanilide to give this result.

Low substantivity in an insoluble dyestuff is often manifested by a tendency to crock and mark off. This is again well demonstrated in the naphthol series, where the most substantive naphthols give colors of best resistance to dry or wet rubbing.

Examples of insoluble substantive materials are quite numerous. Besides the vats and naphthols, there are the Indigosols, where the insoluble vat dye is formed by decomposing the soluble diffusible sulfuric ester: The sulfur dyes, where the Na_2S complex of the reduced dye is soluble and diffusible; Mineral Khaki, where insoluble ferric and chromic hydroxides are formed by decomposing the soluble diffusible acetates. These particular metal hydroxides are extremely substantive. Aniline black is another example. There are few finishing treatments (except dyeing) in which substantivity of this type is involved. The most interesting is the treatment with urea-formaldehyde resins for crushproofing and shrinkproofing. In this case the treating reagent is really a *soluble diffusible* pre-condensate of urea and formaldehyde, consisting of dimethylol urea itself or very low molecular weight polymers. These penetrate the pores by diffusion just as a soluble dye would. On curing the high molecular weight resin is formed. This resin is held in the fiber partly by cellulose-resin secondary valence forces and partly by a submicroscopic mechanical interlocking of the resin chains and the cellulose chains. In any event, the treatment is quite resistant to washing. A permanent flameproof finish using tin salts and precipitating the substantive SnO_2 hydrate in the fibers has been described. This is another example of a substantive insoluble finishing material.

The substantivity we have been discussing so far is due primarily to secondary valence forces. There is another type frequently encountered which depends on the fact that wet cellulose is a negatively charged colloid. As such it can attract and hold positively charged particles by purely electrical forces. These electrical forces act at a distance (in contrast to the secondary valence forces). The positively charged particles may be large enough to be clearly visible in the microscope, far too large to penetrate the pores. A typical example is in the dulling of rayon

with TiO_2 suspensions. In this case, the TiO_2 suspension is specially prepared so that the pigment particles are positively charged. On immersion they are attracted to the surface of the cellulose and held there. The suspension can be exhausted by continued use. Another example of electric-charge substantivity occurs in some wax-emulsion waterproof finishes. Here, too, the wax particles are positively charged. They are attracted and held by the surface of the cellulose. The particles do not penetrate the pores to any appreciable extent, but the bath does exhaust, i.e., the concentration of wax per unit volume of bath becomes lower with use.

The substantivity of the cationic softeners is probably due to their positive charge. In this case, however, the particles are of molecular dimensions and almost certainly penetrate into the pores. Hence, the resistance to washing is quite high. Cellulose has been shown to have base binding and base-exchange properties, by virtue of its occasional carboxyl groups, and it is possible that the cation softeners are held in this manner. This is also, of course, an affinity due to electrical charge. In general, however, the substantivity effects due to electric charge are weaker than those due to secondary valence forces.

When we discuss the affinity of a material deposited on the outer surface of a fiber rather than in the pores, it is customary to use the term *adhesion* rather than the term substantivity. The problem of adhesion is of fundamental importance in the application of additive finishes to fabrics. Additive finishes may be of the water soluble type, such as starch; or of the water insoluble type. The latter include the various synthetic resins (usually applied from solvents or emulsions) and the cellulose ethers and esters. Rubberized fabrics, oilcloth and other coated fabrics, as well as lacquer dyed or lacquer printed fabrics also depend on good adhesion for their quality, particularly for their resistance to water and washing.

It is reasonable to assume that the forces of affinity on the surface of a clean cellulose fiber are similar in nature to those within the pores. On this basis there is no sharp dividing line between substantivity and adhesion. The degree of adhesion of a surface coating to wet cellulose is determined by the relative magnitudes of the secondary valence forces between:—

1. Coating—cellulose
2. Coating—water
3. Water—cellulose

The last named factor is probably of much greater importance in the case of surface coatings than in the case of substances deposited in the pores. This is to be expected since the *total* number of points available for attachment on the cellulose surface is far less than the number available within the pores. If a large proportion of these points is occupied by water molecules, very few points will be available for attaching the coating molecules to the cellulose.

In order to have good adhesion in the presence of water, the cellulose-coating forces must be high relative to the coating-water forces. At the same time, the cellulose-coating forces must be of appreciable magnitude relative to the cellulose-water forces. In the case of starch, for example, the starch-water forces are strong but the cellulose-starch forces are also strong. Starch will wash out of a starched fabric quite easily, but the last traces are difficult to remove. The analogy with a typical direct dye is apparent. On the other hand, some coating materials which are completely water-insoluble have practically no adhesion to cellulose, and easily separate when the cellulose is wet—sometimes even when it is dry. Rubber is a good example of such a substance. This effect is not readily apparent in the case of fabrics because of the purely mechanical interlocking of the coating with the massed bundle of fibers which constitute a yarn. Even with mechanical interlocking, however, there is an adhesion problem on severe usage. In the case of tire cords, for example, the lack of adhesion between rubber and fabric is a source of weakness in the tire. The problem of binding rayon or cotton yarn to rubber has been worked on extensively, particularly in the direction of chemically modifying the yarn so that it will have greater affinity for rubber.

The lighter a coating is in weight, the more we must depend on true adhesion, and the less on mechanical interlocking. In lacquer or pigment printing, for example, the coating must adhere almost perfectly even when soaped, and yet it must be relatively light in order to avoid undue stiffness. In the ink-printing and moisture-proofing of cellophane, we have the problem of getting an adherent coating where there is no chance whatsoever for mechanical interlocking. Only pure adhesion forces are involved. Cellophane is a regenerated cellulose, and its surface properties are very similar to those of a rayon filament. It has been found in this work on cellophane that the differences in adhesion among various resins and coating materials are fully as great as the differences in substantivity among various dyes. So far, relatively few of the numerour resins tried in coating cellophane have proved to have good adhesion in the presence of water. The urea-formaldehyde and the alkyd resins are good, as are many of the natural drying oils, such as linseed and tung oils, and some of the natural gums. These substances are also used in the lacquer printing of fabrics, because of their excellent adhesion. The hydrophillic cellulose ether finishes also have good adhesion and can be modified to give a variety of effects. Many of the currently used resin finishes and coatings, however, depend on mechanical interlocking for their wash-resistance. Consequently, a heavy coat must be used with a consequent lowering of the porosity and softness of the fabric.

Today, research on synthetic resins and coating materials is going ahead at a very rapid pace, and is affecting

the textile industry profoundly from a number of angles, most notably by the introduction of new fibers. It has already had a considerable effect in the special field of finishing cottons and rayons. The need of the armed forces for permanent special finishes is further stimulating new developments in this field. Our knowledge of the adhesion of synthetic polymers to cellulose surfaces will, without doubt, increase very greatly, and in the future a much fuller line of adherent coatings will be available. Thirty years ago, the dyer was quite limited in his choice of wash-fast colors. Today he can get wash-fast colors of practically any shade, light-fastness, brightness or other properties desired. The trend in finishing today is toward permanence and wash-fastness. Many processes for permanent special finishes have already been described or patented. Among them are softeners, weighters, fillers, slip-proofs, mildewproofs, water-repellants, flame-proofs, and finishes to increase tensile strength, abrasion resistance, and wear resistance. Most of these now suffer from high cost, complexity of the application process, or other defects which make them impractical. It is safe to predict, however, that in the future, the finisher will have available a full range of wash resistant treatments to give any desired special effect, and have the fabric retain that effect throughout its serviceable life.

DISCUSSION

Q.: If a cellulosic fabric is dipped in a latex solution, a continuous film is formed. If the fabric has been treated with a cationic surface active agent prior to dipping, the coating seems to be much more even and to leave the fabric more porous. What is the nature of this effect?

A.: I do not think that any surface active agent will make the dispersed rubber particles penetrate the pores of the fiber. It will enable the rubber particles to penetrate between the individual fibers which make up the yarn, thus giving a smoother surface to the fabric and leaving the spaces between the strands of yarn relatively open.

Q.: In regard to the increasing use of rayon in the manufacture of tires—has this any connection with the effects of which you spoke?

A.: I don't think the adhesion of rubber to rayon is any greater than to cotton. My understanding is that rayon's superiority in tire cords is due to its high heat resistance and flex resistance. This is only true of the special high tenacity rayons developed for the purpose. Another point in favor of the rayon is that its properties can be more closely controlled and it can be made more uniform. The intermediate treatments it may get during tire fabrication will take more evenly, and the tires will be of more uniformly high quality.

Q.: What is the influence of the time element on diffusion: specifically can diffusion be accelerated by any mechanical means?

A.: The main factors affecting the rate of diffusion from one region to another are: 1. The size and mobility of the diffusing molecules. 2. The difference in concentration of the diffusing molecules, that is the dyestuff, between the two regions. 3. The temperature. 4. The viscosity (or more generally the total physical nature) of the medium through which the diffusion is taking place.

The overall rate of dyeing is controlled by the rate of diffusion through the cellulose. Diffusion through the dye bath itself to get to the surface of the cellulose is relatively rapid, and agitation of the bath during dyeing makes it relatively unimportant. With any given dye and fiber, the first and fourth factors are fixed. The second factor, concentration difference, gets lower as dyeing proceeds. In actual practical dyeing processes, however, we never reach complete equilibrium. The dye never reaches the innermost portions of the fiber so there is always a relatively large concentration difference between the outer parts and inner parts of the fiber. This leaves temperature as the real controlling factor in rates of dyeing. I doubt if any mechanical means such as pressure or agitation can have an effect one way or the other. Their influence can't extend into the pores of the fiber where the diffusion and adsorption is taking place. They are useful in eliminating diffusion effects in the bath itself by bringing fresh bath into contact with each fiber of the yarn. Good penetration of the yarn itself is necessary so that each individual fiber surface is furnished with fresh uniform dyebath. The mechanical devices accomplish this, but they do not affect diffusion within the fiber. Temperature is the most important factor.

Q.: May we add one more method of getting diffusion: steaming or ageing?

A.: That is just another method of heating.

Q.: How about the bombardment of fibers and the dye by the steam molecules? Wouldn't that be much more rapid than just boiling water?

A.: I doubt if there would be much difference. The dye molecules diffuse through a liquid medium and it is the temperature of that medium that controls the rate of diffusion. If dry steam were acting on a dry fabric the effect would be no greater than that of dry air at the same temperature. For steam to show its effect the fabric must be wet. Saturated steam is used to prevent loss of moisture from the fabric, and glycerin or other hygroscopic agents are often present for the same purpose.

Q.: With regard to water repellents, isn't there some question as to whether the wax is retained on the fiber by purely mechanical interlock, rather than by any substantivity effect?' When water repellents are applied to piece goods there doesn't seem to be any indication of exhaustion in the liquor. In a package dyeing machine, however, you get absolutely clear liquor. This indicates filtration and mechanical holding of the wax particles on the fibers, even though there is a technique for distributing the repellent more or less uniformly through the package.

A.: I think I was careful to hedge when I mentioned

water repellents, and said that only certain types of repellent show substantivity; those which consist of a positively charged suspension of wax particles. The point I wanted to bring out was that the particular type of substantivity due to electric charge will occur whenever we have a positively charged colloidal suspension. Some repellents are made so that the particles carry a positive electric charge. If we take a beaker of this repellent solution and immerse pieces of cloth in it repeatedly, we will soon find that the concentration of wax particles in the remaining solution is less than it was in the original solution. The actual weight of wax per unit volume is smaller; conversely, the weight of wax per unit take-up on the cloth is greater.

Q.: In a still bath or an agitated bath?

A.: Agitation speeds up the total exhaustion by preventing local exhaustion close to the fibers. I think the effect can be demonstrated without agitation. I think it could even be demonstrated with cellophane where there is no chance whatsoever for mechanical pickup, provided we exposed enough cellophane surface to the action of the bath.

Chemical Industry—

(Concluded from page 163)

John Grady: I would like to ask Dr. Landis the tendency of the German people toward starting branch plants in China and South America unsupported by the Homeland.

Dr. Landis: That doesn't solve the home problem. It may in part, but it isn't near the complete solution for one may run into an exchange difficulty. So long as you can't get money in a form in which Germany can buy food and raw materials it is not as good as export of goods. It can succeed in some countries. I don't think it would be much good in a place like China because I don't know as China could export the food Germany will need as there is no surplus.

Philip Durfee: You spoke about patents and chemical developments coming out each year. During the last two or three years we have been rushed for war purposes. Are we going to get a burst of new products, various and sundry developments after the war, or will it level off too?

Dr. Landis: I think that over a period of time there will not be a very big bulge in development in the curve. For four or five years certain developments have been dammed up. It will take two or three years to construct for them. There will be a little hump but it will not change the general trend which has been going on for years. That is my opinion.

Hugh Christison: You made a very thought-provoking remark, Dr. Landis, to the effect that you either have to fight or feed a nation and some of us are wondering how that will apply to Japan in our future dealings with that country.

Dr. Landis: That depends upon the sort of peace that is created. Your question can be answered only if we know something about the type of peace. If it is not a constructive type, we are making progress to the next world war. If I had to bet on it, I would place odds on the politicians not doing too well on a conservative type of peace.

CORRECTIONS

Re 20th Anniversary Meeting, Piedmont Section

IN the announcement of the 20th Anniversary Meeting of the Piedmont Section which appeared on page P129 of the March 13th issue, the name of Harold M. Chase was unintentionally omitted from the list of past chairmen. Mr. Chase served as chairman from January 1925 to October 1925.

It was erroneously stated that the inaugural meeting of the section was held in the Poinsett cafeteria in Greenville. This should have read the "Imperial Hotel Cafeteria" as the Poinsett Hotel did not exist at the time the section was formed.

Biographical Sketch of the Late PROFESSOR CHARLES STEBBINS DOGGETT

PROFESSOR Charles Stebbins Doggett was the second one to serve as director of the Textile Department of the Clemson Agricultural College, Clemson, South Carolina. Clemson College inaugurated its courses in Textile subjects in 1898 and Professor Doggett became the second director in the Fall of 1905, which position he held until his retirement in the Fall of 1927.

Professor Doggett was Chairman of the Piedmont Section of the American Association of Textile Chemists and Colorists in 1926 and 1927.

When news of the 20th anniversary of the forming of the Piedmont Section was made public, it touched the memories and the interest of a large number beyond the boundaries of the Piedmont Section. Professor Doggett's daughter, wife of R. W. Joerger who is Secretary of the Rhode Island Section, has contributed the following brief sketch of her father's life as it touched his training and contribution to the development of the textile industry and the education of southern students, who showed an interest in following textiles in the south in the first quarter of this century.

"Charles Stebbins Doggett was born in Groveland, Massachusetts, November 27, 1858, the son of Reverend Thomas and Frances Lee (Barrows) Doggett. He attended Kimball Union Academy, Meriden, New Hampshire and Oberlin College, Oberlin, Ohio. Professor Doggett decided to make the teaching of applied chemistry his life work, although it was many years before this ambition was realized in spite of his excellent preparation and experience.

"His first business experience in the textile industry was at the Willimantic Linen Company, Willimantic, Connecticut. Later connections included Walpole Chemical Works, Walpole, Massachusetts. During these five and one-half years he gave considerable time to the study of applied chemistry in bleaching and dyeing processes. He then went abroad to study at Yorkshire College, (now Leeds University) considered the best technical school in England. He studied at the Federal Polytechnic at Zurich, Switzerland and at Royal Prussian Polytechnic, Aachen. While abroad he had the opportunity of studying under such eminent instructors and scientists as Professor Thorpe, Treadwell, Beaumont, Classen, Hummel, and Lunge.

"He returned to America in 1886 to gain further experience in industrial chemistry. He lectured at the Massachusetts Institute of Technology in 1892 and '93. His next experience in the educational field came when he was offered an opportunity to teach applied chemistry at Clemson College under President Mell.

"Professor Doggett became head of the Textile Department in 1905 and gave unstintingly of his experience, time, and effort to build the Textile Department courses and encourage students pursuing such studies. The Clemson College Textile exhibit, under the supervision of Professor Doggett in Boston, Massachusetts in 1914, was of widespread interest. The cooperation of eastern textile machinery builders helped materially in building the prestige of the textile courses at Clemson College. Professor Doggett instructed night courses for the ambitious mill workers, who wanted to improve their time by night study. He was also prominently identified with the establishment of a number of vocational schools in the Piedmont Section. He was appointed State Superintendent of Industrial Education of South Carolina in 1918. During his first year of this appointment, vocational evening classes were conducted in fourteen mills representing 948,424 spindles, one-fifth of those in the State. In 1926 Clemson College conferred upon him the degree of Master of Science.

"He was present at the inaugural meeting of the American Electro-chemical Society held in Philadelphia, April 1902. He attended the first meeting of the Southern Section of the American Association of Textile Chemists and Colorists in Greenville, South Carolina, October 1924. He was a member of the American Institute of Chemists and many other Technical societies and was one of the first honorary members of the Iota chapter of Phi Psi fraternity, Clemson's first national college fraternity."

Hundreds of Professor Doggett's students will ever remember him and will be grateful to him for the encouragement and help that he gave so freely. His chief hobby was his garden, which gave him great delight in his declining years.

"I hope the Piedmont Section will survive," was a statement made by Professor Doggett to a friend who sent congratulations to him upon his election as chairman in 1926. The records show that his hopes came true as evidenced by the growth of the Piedmont Section from approximately twenty members in 1924 to approximately three hundred members in 1944.

Professor Doggett died on November 22, 1929 and is buried on Cemetery Hill, Clemson, S. C.

INTERSECTIONAL CONTEST, NEW YORK SECTION

PATRICK J. KENNEDY, chairman of the New York Section, has announced the appointment of Olen F. Marks as chairman of the Intersectional Contest Committee.

Olen F. Marks

Mr. Marks is assistant manager of the fabric development and export department of American Enka Corporation. He has been with American Enka in New York for the past 8 years and previously was at their plant in Enka, N. C. for a year and a half. Prior to that he had been with the Merrimac Manufacturing Co. in Lowell, Massachusetts and Huntsville, Alabama.

Mr. Marks has been active as a member of various committees of the national association and is now a member of the research committee, chairman of the sub-committee on the shrinkage of fabrics composed of manufactured organic fibers, and a member of the sub-committees on fastness to washing of dyed organic fibers, dry cleaning, and shrinkage of textiles. He is also a member of the American Association of Textile Technologists.

Dr. Herman E. Hager, technical manager, General Dyestuff Corp., will act in an advisory capacity to the committee. Other members of the committee include:

F. B. Brennan
U. S. Testing Co., Inc.
M. Meier
Burlington Mills Corp.
E. H. Benzing
American Bemberg Corp.
Albert Ruth
Bloomburg Mills, Inc.
Julius B. Goldberg
J. P. Stevens & Co., Inc.

Arthur R. Wachter
American Viscose Corp.
H. A. Dickert
E. I. du Pont de Nemours & Co., Inc.
Leonard S. Lang
Cluett, Peabody & Co., Inc.
Walter Mueller
Cliffside Dyeing Corp.
P. J. Wood
Royce Chemical Co.
Carl H. Brubaker
Standard Bleaching & Printing Co.
Oscar R. Flynn
Waldrich Co.
Mr. Richardson
Waldrich Co.
Donald Martin
General Dyestuff Corp.

MEMBERSHIP APPLICATIONS

Senior

Otto Davids—Colorist, Bound Brook Textile Dye & Print Works, Bound Brook, N. J. Sponsors: N. W. Akst, I. Lovit.

Harvey Eastman—Supt. of Bristol Mill of American Thread Co., Bristol, Tenn. Sponsors: R. W. Freeze, J. Anderson.

Oscar Edwards—Dyer, Bellemeade Hosiery Mills, Nashville, Tenn. Sponsors: R. W. Freeze, H. Whelchel.

George T. English—Head Finisher, Fair Lawn Finishing Co., Fair Lawn, N. J. Sponsors: T. F. O'Brien, W. G. Helmus.

Norman V. Feldpush—Chief Chemist, Wilson-Martin Division, Wilson & Co., Upper Darby, Pa. Sponsors: J. L. Wilson, W. S. McNab.

Mario L. Fillippeli—Finishing Supervisor, Burlington Mills Dyeing & Finishing Co., Greensboro, N. C. Sponsors: R. Gilliam, T. Dwyer.

Robert W. Fritzinger—Dyehouse Foreman, General Ribbon Mills, Inc., Catasauqua, Pa. Sponsor: A. E. Raimo.

George F. Gaede—Vice-President and Sales Manager, Fair Lawn Finishing Co., Richmond Piece Dye Works, Inc., New York, N. Y. Sponsors: J. E. Meili, T. F. O'Brien.

Arzy R. Gray—Pigment Color Chemist, Imperial Paper & Color Corp., Glens Falls, N. Y. Sponsors: W. H. Horne, R. I. Peters.

August Haeberlin—President, Braendly Dye Works, Inc., Beacon, N. Y. Sponsors: F. McKinnes, T. F. O'Brien.

Arthur H. Halsey—Master Dyer, Morgan Dyeing & Bleaching Co., Rochelle, Ill. Sponsors: L. Hoehn, Jr., B. H. Sharman.

Gilbert F. Hamilton—Overseer of Dyeing, The Bell Co., Worcester, Mass. Sponsors: R. E. Hale, E. E. Fickett.

James M. Hamilton—Dyer, Nebel Knitting Co., Charlotte, N. C. Sponsors: L. M. Boyd, R. H. Smith.

Kenneth M. Harms—Master Dyer, Morgan Dyeing & Bleaching Co., Rochelle, Ill. Sponsors: L. Hoehn, Jr., B. H. Sharman.

Moses L. Harrison—Supt. of Dyeing, Beaunit Mills, Cohoes, N. Y. Sponsors: J. Colman, J. A. Waring.

Walter R. Howell—Vice-President and Sales Manager, Bradford Dyeing Association, New York City, N. Y. Sponsors: G. L. Baxter, E. J. Driscoll.

John H. Hulton—Master Dyer, W. E. Hulton Dyeing Co., Philadelphia, Pa. Sponsors: A. E. Raimo, E. Hulton.

Charles M. Keenan—Overseer of Dyeing, Hanes Dye & Finishing Co., Winston Salem, N. C. Sponsors: Joe Okey, H. B. Dixon.

Morris M. Leven—Chief Chemist, Washine-National-Sands, Inc., Long Island City 1, N. Y. Sponsors: T. F. O'Brien, J. Escoett.

Henry S. Lewis—Partner, Lewis & Hansis Co., Peabody, Mass. Sponsors: C. H. A. Schmitt, H. A. Ross.

Andy P. Livi—Foreman, Inter-State Dyeing & Finishing Corp., Passaic, N. J. Sponsors: D. Baldecchi, D. J. Graziano.

William J. Loeffler—Sales Manager, American Aniline Products, Inc., New York 3, N. Y. Sponsors: N. A. Johnson, G. C. Armour.

Andrew S. Mackenzie—Supt., Dyeing and Finishing, Stillwater Worsted Mills, Inc., Harrisville, R. I. Sponsors: F. L. McCool, E. A. Sherburne.

David C. MacNeill—Manager, Nyanza Color & Chemical Co., Philadelphia, Pa. Sponsors: C. Baeringer, C. B. Wood.

Earle D. McLeod—Assistant Technical Director, Arnold Hoffman & Co., Inc., Providence, R. I. Sponsors: J. N. Dalton, H. T. Rooney.

Meyer Mendelsohn—Chief Chemist, Applied Chemical Corp., New York City, N. Y.

Michael J. Negro—Textile Technician, Allied Textile Printers, Inc., Paterson, N. J. Sponsors: H. Baumann, D. McHugh.

William Opderbeck—Textile Printing Colorist, United Piece Dye Works, Lodi, N. J. Sponsors: M. K. Emerson, C. J. Rahm.

Fred H. Parris—Overseer, Pacific Mills, Lyman, S. C. Sponsor: J. Crist, L. G. Atkins.

Frederick W. Schreiber—Director of Research, The Personal Products Corp., Milltown, N. J. Sponsors: T. F. O'Brien, P. J. Kennedy.

Anthony M. Schwartz, Dr.—Research Director, Alrose Chemical Co., Cranston, R. I. Sponsors: M. Weisberg, R. W. Joerger.

Dominick R. Serra—Textile Colorist, Scholler Brothers,

Inc., Philadelphia 34, Pa. Sponsors: L. O. Koons, E. C. Dreby.

Domenick Sottile—Top Dyer, W. E. Hulton Dyeing Co., Philadelphia, Pa. Sponsors: A. E. Raimo, E. Hulton.

Harry Spayde—Print Colorist, Shamokin Dye & Print Works, Shamokin, Pa. Sponsors: L. Lanterman, J. Pfromm.

Theodore V. Staub—In Charge, Fabric Development and Research, American Bleached Goods Co., Inc., New York City, N. Y. Sponsors: N. A. Johnson, E. J. Driscoll.

James A. Stevenson—Supt., Bradford Dyeing Association, Wes.erly, R. I. Sponsors: L. S. Little, J. A. Pawson.

Stewart M. Thomson—Dyer, Burlington Dyeing & Finish-Co., Greensboro, N. C. Sponsors: R. H. Gilliam, T. J. Dwyer.

Stephen F. Tremmel—Dyer, Botany Worsted Mills, Passaic, N. J. Sponsors: T. F. Malloy, P. M. Otto.

Fritz Tscheulin—Head Dyer, Fair Lawn Finishing Co., Fair Lawn, N. J. Sponsors: T. F. O'Brien, W. G. Helmus.

Fred E. Uhlin—Foreman, Fair Lawn Finishing Co., Fair Lawn, N. J. Sponsors: T. F. O'Brien, W. G. Helmus.

Albert M. Walker—Dyer and Chemist, The Angus Park Woolen Co., Hanover, Conn. Sponsors: A. E. Sampson, G. K. Plotica.

Louis I. Weiner—Technologist, Philadelphia Quartermaster Depot, Philadelphia, Pa. Sponsors: E. F. Monroe, R. S. Stribling.

Associate

Walter E. Bolter—Salesman, Fair Lawn Finish Co., Fair Lawn, N. J. Sponsors: T. F. O'Brien, W. G. Helmus.

George T. Collins—Chemical Engineer, Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

Ernest Curry—Assistant Supt., Burlington Dyeing & Finishing Co., Greensboro, N. C.

John D. Gercke—Salesman, Technician, Stein, Hall & Co., Inc., Philadelphia, Pa.

Arne Greyborn—Chief Chemist, Bruck Silk Mills, Ltd., Cowansville, Quebec, Canada.

Ernest H. Hart—Fabric Development, Research and Technical Sales Service, Fair Lawn Finishing Co., New York 18, N. Y. Sponsors: J. E. Meili, T. F. O'Brien.

Harry Jefferis—Editor, Chemical Section, Daily News Record, New York, N. Y.

Erico Lengning—Consulting Chemical Engineer, Buenos Aires, Argentina, S. A.

Griffin S. Mackey—Salesman, Richmond Piece Dye Works, Richmond, Va. Sponsors: T. F. O'Brien, W. G. Helmus.

James T. McAden—Associate Editor, Textile Bulletin; Associate Editor, Southern Knitter; Clark Publishing Co., Charlotte, N. C.

Reginald Menzer—General Supt. of Printing, Bruck Silk Mills, Ltd., Cowansville, Quebec, Canada.

George F. Napier, Jr.—Technical Service, Aralac, Inc., Taftville, Conn.

Iver A. Rolfe—Vice-President and General Manager, Morgan Dyeing & Bleaching Co., Rochelle, Ill. Sponsors: L. Hoehn, Jr., B. H. Sharman.

Junius M. Smith—Business Manager, Textile Bulletin & Southern Knitter, Charlotte 2, N. C.

Elliot I. Stokes—Philadelphia Branch Manager, Stein, Hall & Co., Inc., Philadelphia, Pa.

John C. Tarvin—Technician, S. C. Johnson & Son, Inc., Racine, Wisconsin.

Junior

Ernest H. Allard—2nd Lt., U. S. Army. Sponsors: E. E. Fickett, H. C. Chapin.

Samuel Alvarez—Colorist, Anilinas Du Pont, Echavarria Cabo & Cia., Medellin, Colombia, S. A. Sponsors: C. A. Seibert, J. Killheffer.

Henrietta A. Busby—Technician in Textile Laboratory, The Apponaug Company, Warwick, R. I. Sponsors: G. H. Wood, N. Barlow.

Dorothy T. Koush—In Charge of Bureau of Standards, Lord and Taylor Department Store, New York City, N. Y. Sponsors: P. B. Mack, L. S. Little.

Raymond A. Saunders—In Charge of Spectrophotometry Laboratory, Allied Chemical & Dye Corp., Buffalo, N. Y. Sponsors: W. C. Durfee, E. S. Chapin.

Harold R. Schroeder—In Charge of Physical & Chemical Analysis of Woolens, U. S. Coast Guard Textile Laboratory, New York, N. Y. Sponsors: W. M. Jergen, J. Hindermaier.

Richard O. Steele—Chemist, Rohm & Haas Co., Philadelphia 37, Pa. Sponsors: S. N. Glarum, C. V. Stallings.

Student

Harvey L. Friedman—Georgia School of Technology, Atlanta, Ga. Sponsor: C. A. Jones.

Applications for Transfer to Senior Membership

Waldemar R. Kuenzel—Manager, Fabric Development Division, E. I. Du Pont De Nemours.

Washington R. Smith—Salesman, Pioneer Salt Co., Philadelphia, Pa.

CHANGE IN MEETING DATE, NEW YORK SECTION

THE meeting of the New York Section, orginally scheduled for May, will be held at the Downtown Athletic Club on June 9th.

TRADE NOTES • NEW PRODUCTS

• JOINS ARIDYE CORPORATION

Winn W. Chase has resigned as executive editor of *Textile World* to become director of technical publicity and market research for Aridye Corporation, Fair Lawn, New Jersey. He will supervise these activities

Winn W. Chase

of the company, including the investigation of markets for new products and the study of the postwar needs of those branches of the textile industry served by Aridye Corporation and associated companies.

Mr. Chase specialized in chemistry at Brown University and served in the Chemical Warfare Service during World War I. In 1929, after 10 years of experience in the textile industry, much of it with Mount Hope Finishing Company, he joined the editorial staff of *Textile World*. As technical editor, and more recently executive editor, he was responsible for the major share of the publication's editorial content. He is the author of numerous articles dealing with the technical and economic aspects of the textile bleaching, dyeing, printing, and finishing industry, and is a contributor to the Encyclopaedia Brittanica and Collier's Encyclopaedia.

Mr. Chase is a member of the American Association of Textile Chemists & Colorists, the Society of Dyers & Colourists (England), the American Association of Textile Technologists, the American Society for Testing Materials, and the Textile Research Institute.

Establishment by Aridye Corporation of this new department devoted to technical publicity and market research was prompted by the rapid expansion of the company and the broadened scope of its service to the textile industry. Organized in 1938, as a subsidiary of Interchemical Corporation, the company introduced a new process for printing textiles with pigmented colors. In 1942 it announced the development of a pigment-dyeing process which had a number of peacetime applications. It is also being employed in the production of camouflage strips, mosquito netting, etc. Later Aridye became selling agent for Ceglin, an alkali-soluble cellulose ether, produced by Sylvania Industrial Corporation. In December, 1943, the company purchased the business of Phoenix Color & Chemical Company, Paterson, New Jersey, manufacturers of dyestuffs and intermediates, and is operating the plant as the Phoenix Color Division of Aridye Corporation. Currently, Aridye is completing the development work on several new products which are expected to find extensive use in processing of textiles in the postwar period.

• CHAIRMAN, SUB-COMMITTEE B-4

J. Robert Bonnar has been appointed acting chairman of sub-committee B-4, entitled, Bleaching, Dyeing and Finishing, Committee D-13, entitled, Textile Materials, of the American Society for Testing Materials. Mr. Bonnar is technical director of General Dyestuff Corp. and previously held the same position with the American Printing Co., Fall River, Mass. He is a member of the research committee of the A.A.T.C.C., chairman of the subcommittees on Transference of Color and Resistance to Insect Pests, and a member of several other sub-committees.

Sub-committee B-4 has been broken down into sections. The sections, and the chairmen who have been appointed to head them up, are as follows:

Section No. 1—Accelerated Ageing Tests for Cotton—Kenneth H. Barnard, Pacific Mills.

Section No. 2—Resistance of Textiles to Insect Pests—Herman E. Wilde, Merck & Co.

Section No. 3—Resistance of Textiles to Micro-Organisms—Dr. O. B. Hager, Rohm & Haas Co., Inc.

Section No. 4—Identification of Textile Finishes—F. P. Brennan, U. S. Testing Co.

Section No. 5—Water Resistance of Textile Fabrics—G. A. Slowinske, E. I. duPont de Nemours & Co., Inc.

Section No. 6—Fastness to Washing and Laundering—Charles W. Dorn, J. C. Penney Co.

Section No. 7—Resistance to Fire.

Section No. 8—Determination of Copper Content.

Section No. 9—Light Fastness.

• NAVY "E" AWARD

Lima Woolen Mills Company, Lima, Ohio, has won the Navy "E" award for excellence in the production of Navy blankets, according to an announcement just released by the Navy Department.

• ELECTED VICE-PRESIDENT

W. N. Williams, formerly Assistant to the President, Westvaco Chlorine Products Corporation, has been elected Vice-President in Charge of Production.

Mr. Williams, a Westvaco director since

W. N. Williams

1941, joined the company in 1924 in a production supervisory capacity and subsequently became General Manager of Westvaco's West Coast operations. Transferred to New York in 1938 in an executive sales capacity, he became Assistant to the President in 1941.

• JOINS NATIONAL FOREMEN'S INST.

Recently with the War Production Board, Planning Division as Senior Economist, Bruno R. Neumann has joined the National Foreman's Institute, Inc., Deep River, Conn., as Labor Economist and Editorial Director. He will make his headquarters at the company's editorial office, 527 Fifth Ave., New York, and will head up the institute's research and consulting service on labor economics and labor relations. Prior to his service with the War Production Board, Mr. Neumann was a member of the economic research staff of the National Association of Manufacturers.

• NEW DIRECTORY

Publication of the Directory of the American Council of Commercial Laboratories has just been announced. It furnishes business and Governmental executives, as well as other interested parties, with information about the scope of activities of independent laboratories and the advantages to be derived from utilizing their services in the solution of scientific, engineering, testing and inspection problems. Copies may be obtained from the Executive Secretary, A. J. Nydick, 63 Wall St., New York 5, N. Y.

● ANNUAL DINNER, D.C.A.T.

The Drug, Chemical and Allied Trades Section of the New York Board of Trade, Inc., dedicated its 19th Annual Dinner, held on Thursday, March 9, 1944, in the ballroom of the Waldorf-Astoria, to the Drug, Chemical and Allied Industries for their outstanding performance in the war effort and to the Military, Naval and Public Health Services which have so ably directed these achievements. Twenty-two hundred leaders of the Drug and Chemical Industries from all parts of the country attended.

● PLASTIC FIREPROOF UPHOLSTERY

A new plastic fireproof upholstery, developed by United States Rubber Company, is said to have been ordered by the Navy as mandatory equipment for all combat ships, to provide added protection against fire. The upholstery covering is said to be non-smoldering, gasoline and oil-resistant and extremely durable under wide temperature ranges. Other uses are as turret lining and seat covering in both bomber and fighter planes.

● CLASSIFIED DIRECTORY

The eighth edition of the Classified Directory, 1944, can now be obtained from the Association of Consulting Chemists and Chemical Engineers, Inc., 50 E. 41st St., New York 17, N. Y. Some of the highlights of this edition are: Ninety-six pages of information and guidance; increased membership and classification; new layout; excerpts from Code of Ethics and from By-Laws printed on inside of front and back covers. Copies will be sent on request, without charge.

● NEW TEXTILE LIBRARY

Good Housekeeping has announced the opening of its new Textile Library, pointing out that it is one of the very few textile libraries in existence, and the only one to be organized by a magazine. *Good Housekeeping's* Editor, Herbert R. Mayes, said that it was a logical addition to *Good Housekeeping's* laboratories, kitchens, laundries, beauty clinic and the other special editorial facilities for studying consumers' needs and problems. The Textile Library was organized by Ethel R. Duhan, former librarian of Cluett, Peabody's Sanforized Fabric Library, for Martha Stout, *Good Housekeeping's* Fashion Editor. It will serve the Fashion Department as a central source in selecting fabrics to be shown in the magazine's pages. Fabrics will be collected from mills and converters throughout the country and catalogued for the Fashion Department's inspection. The Textile Library is located in Room 500, Hearst Magazine Magazine Building, 57th Street at 8th Avenue, New York City.

● JOINS ASA

Bernice S. Bronner, recently of the Good Housekeeping Institute, has joined the staff of the American Standards Association according to an announcement made recently. She will fill the post left vacant by Morris L. Chandross, loaned to the Office of Civilian Requirements of the War Production Board in Washington.

Miss Bernice S. Bronner

Miss Bronner, who will hold the title of textile technologist in her ASA work, is already familiar with the activities of the Association through service on ASA Committees. She brings to the American Standards Association a rich background of experience in the home economics field.

Previous to her appointment in the ASA, Miss Bronner was head of the textile laboratory of Good Housekeeping Institute, where her work entailed assigning and supervising all physical, chemical and wear tests, writing textile editorials for the magazine and checking textile advertising copy offered for advertising. Before this, Miss Bronner was with Brown Durrell Co., hosiery and underwear distributors. Here she set up a testing laboratory for hosiery, lingerie, etc., wrote specifications for these articles, supervised testing of goods and visited stores to teach saleswomen how to sell. Miss Bronner has also for several years, taught a class in "Fabrics" at the Tobe-Coburn School for Fashion Careers.

Miss Bronner is a graduate of the New York State College for Teachers and is Secretary of the American Association of Textile Technologists, Vice-Chairman of the Membership Committee of the American Association of Textile Chemists & Colorists, a member of the American Home Economics Association and the ASTM Committee D-13, in charge of specifications for textile materials.

● S.O.C.M.A. MEETING

The Synthetic Organic Chemical Manufacturers Association held their regular monthly luncheon and meeting at the Chemists' Club, New York City, Friday, March 17, 1944. The next meeting of the Association will be held on Friday, April 14, 1944.

● U. S. CHEMICAL PATENTS

The Office of Alien Property Custodian announces the completion of a project for publishing abstracts of 7000 foreign-owned United States chemical patents which were seized by the Alien Property Custodian and are now being licensed to American manufacturers in accordance with a policy announced sometime ago. These abstracts are published in thirty-four sections, under the general classifications of General Chemistry, Inorganic Chemistry, Organic Chemistry and Miscellaneous. The cost per section is $1 or $25 for the complete set of 33 sections. Orders should be sent to the Office of Alien Property Custodian, Chicago 3, Ill.

● CHEMICAL SHOW

The third National Chemical Exposition sponsored by the Chicago Section of the American Chemical Society, will be held November 15 through 19, 1944 at the Chicago Coliseum, Chicago, Ill. Headquarters for the show have been opened at 330 South Wells St., Chicago 6, Ill.

● TEXTILE INSTITUTE

The Virginia Corporation Commission has granted a charter of incorporation to a group of trustees representing twenty-eight textile mills in the East for the formation of the Institute of Textile Technology at Charlottesville, Va., with Ward Delaney, Charlotteville, N. C., President, and Arthur M. Allen, Providence, R. I., Secretary. The purpose of the institute, as revealed by the charter, is to maintain an educational institution and to promote scientific research and processes related to the textile industry. The charter provides that none of its profits shall inure to the benefit of any member or individual and prohibits its use of propaganda designed to influence legislation. It is understood that trustees will be named from many of the largest textile mills in the East and that courses will be offered in chemistry, electronics, metallurgy, physics and allied subjects.

● LAVOISIER COMMEMORATED

A meeting in commemoration of Lavoisier, "Father of Modern Chemistry," was held March 31st at the Hotel Commodore by the American Section of the Society of Chemical Industry jointly with the New York Section of the American Chemical Society. Dr. Foster Dee Snell, Chairman of the American Section, presided.

Professor Leon Lortie of the University of Montreal had as the subject of his speech "The Life of Lavoisier." In his review, he pointed out that his accomplishments were due in large measure to his tremendous creative ability, his clearness of vision, his faculty for using just the right approach to a problem and his willingness to discard preconceived ideas when scientific experi-

ment pointed the way to their fallacy. It is significant to note that his famous Traité Elémentaire de Chimie, the gospel of the chemical revolution, was published the very year that the fall of the Bastille marked the beginning of the French revolution, the revolution which produced the sanguinary men responsible for Lavoisier's death on the guillotine. Lavoisier left with us an organized science, a new way of thinking which basically is still with us, although many important changes have been made.

Mr. Lammot du Pont, Chairman of the Board of Directors of E. I. du Pont de Nemours and Company, spoke on "Lavoisier, An Estimate." He noted that when Lavoisier picked up the scientific pieces and put them together into modern chemistry "he did not find them all in one place or one country."

"He found them in laboratories in many lands," continued Mr. du Pont. "For the creative mind has no national, political or geographic boundaries. The man with an idea may be an Englishman, a Frenchman, a German, a Swede, a Dutchman, anybody. And it's up to us in the business of chemistry, if we don't want to fail our country and mankind, to find that man wherever he may be, get his idea, and bring it home to our laboratories and put it to work. That is what Lavoisier did. That was the catalyst that insured the success of his chemical revolution."

The American chemical industry, the speaker declared, made itself fit to cope with the emergency by its own originality and by acquiring developments from elsewhere, just as Lavoisier did back in the 18th century.

While many vital materials originated in America, and more than 50 of present Du Pont products were developed in Du Pont laboratories, he said, the bringing to this country of many chemical developments helped to make the nation secure.

"It is not too much to say that bringing these chemical inventions to America in the years of peace helped materially to make the 'miracle of production' possible in time of war," he said.

Going back to the situation existing at the outbreak of the first World War, Mr. du Pont pointed out that at that time the synthetic chemical industry belonged to Germany.

Mr. du Pont pointed out that America learned her lesson of chemical self-sufficiency the hard way and began to gather her chemical facts just as Lavoisier had done from laboratories all over the world.

"In 1941, when war came," he continued, "she had the chemical situation well in hand. She had plastics, nylon and atabrine in production and ready to take the place of certain strategic materials, silk and quinine. She had neoprene in production and Buna-S in the experimental stage to use instead of rubber. She had thousands of other chemical products that could be diverted from the things of peace to the tools of war."

Although many of them had originated in American laboratories, the speaker gave in detail a long and important list that had been brought to this country from other lands.

● SHERWIN-WILLIAMS APPOINTMENTS

The Sherwin-Williams Company, paint and chemical manufacturers, announces the appointment of B. M. Van Cleve as General Manager of its Pigment, Chemical and Color Division with headquarters in New York City at 295 Madison Avenue. Succeeding Mr. Van Cleve as New York Manager of the Division is T. H. Zappert who, for the past five years has been a representative at the New York office. Mr. Van Cleve completes twenty-five years of service with the Sherwin-Williams organization this year.

● COLORS FOR FALL, 1944

Woolen and Rayon Colors

The Textile Color Card Association has just issued their advance Woolen and Rayon Collections for Fall, 1944. The Association has created new colors not only for their style value but in accordance with existing dyestuff regulations in full support of our Government's wartime conservation measure, it was stated by Mrs. Rorke, Managing Director of the Association.

Millinery Colors

Nine new colors for fur and wool felt and three new colors for wool felt only have been adopted for the 1944 fall and winter seasons, by T. C. C. A.'s Millinery Color Committee. The committee, which cooperated with the Association in the selection of the colors, represents leading firms in the felt hat body industry.

Glove Colors

Eleven colors have been adopted for Fall 1944 by the Glove Color Committee of the T.C.C.A.

● RE-ORGANIZATION OF BUTTERWORTH

Following consultations with the Company's counsel, a plan for the re-organization of H. W. Butterworth & Sons Co. was evolved—and approved by the Board of Directors — which would enable junior executives, superintendents, foremen and others connected with the Company in executive or supervisory capacity to secure stock and thus have a definite interest in the growth of the Company. The plan also made it possible for the investors and decedents' estates now holding stock in the Company to exchange it for an obligation of the Company and so facilitate the repayment of their investment in the Company.

In this re-organization plan, there were two problems to be solved . . . (1) The majority of the stock was held by investors and decedents' estates not actively participating in the management of the Company. Practically none of the employees of the Company, except a limited number of executives, held stock. (2) The complaints of investors and decedents' estates because of the Company's failure to declare or pay dividends since 1930.

Up to the time the re-organization plan was approved, there were 11,000 shares of company stock—8,757 shares being held by investors and decedents' estates. Included in this number were a certain portion of shares which had been sold in anticipation of re-organization.

The plan of re-organization involved the creation of debenture issue, not to exceed $300,000.00. The holders of Company stock not actively engaged in the management would be given an opportunity to exchange one share of stock for one $50.00 bond of the debenture issue. Persons actively associated with the management, who are stockholders, have waived the right to exchange their stock for debentures.

These debentures are to be the general direct obligation of the Company but are not a lien against the assets of the Company unless the Company pledges or mortgages its assets or subjects the same to lien. Then the debenture issue will be ratably and equally secured.

The plan of re-organization met with the unanimous approval of all stockholders at a special meting held February 29, 1944.

The final arrangement will probably work out to be 4500 shares outstanding of common stock and about $280,000.00 worth of debentures, with an approximate surplus of $500,000.00.

● AUTHORIZATION FOR ADDITIONAL DYESTUFFS

Where dyestuffs, over and above regular quotas, are needed in the production of essential textile fabrics for both military and civilian use, authorization for additional quantities may be granted, the War Production Board announced recently.

The authority for the additional quantities, to be used as specifically directed, will be given either in the form of individual letters or published directions.

The action was taken in amendments issued recently to Conservation Order M-103, which controls the use of organic coloring matter.

● USE OF AVCONIT

A survey among leading hosiery manufacturers made by the American Viscose Corporation shows, it is claimed. that defi-

nitely superior results in production and efficiency have been obtained with yarns processed with Avconit, the chemical size developed by the company for holding the twist of rayon yarns during their manufacture into hosiery.

According to hosiery manufacturers included in the survey, there is a marked reduction in production waste when hosiery yarn is treated with Avconit. It is stated that press-offs averaged only 2.7 with Avconit as compared to 16.9 with yarn not so treated. As a result, waste was greatly reduced, the average saving per manufacturer being 1,542 pounds of rayon yarn per month.

Other important advantages attributed to Avconit are the fewer instances of needle breakage and other machine damages. These factors, it is obvious, increase in importance as replacements of knitting machine parts become more difficult. Moreover, as pointed out by the hosiery manufacturers, the Avconit process, with its elimination of snarls and kinks, results in a much better running performance. This, together with the reduction of waste, is said to cut down overhead costs and to increase the production and earnings of employees.

• CLASSIFIED • ADVERTISEMENTS

The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i.e., help wanted, machinery or supplies for sale—the rate is $6.25 per column inch or less per insertion.

POSITION WANTED: Hosiery Dyer. 17 years' experience covering all types of dyes and a wide variety of fabrics. Draft exempt. Write Box No. 474, American Dyestuff Reporter, 440 Fourth Ave., New York, 16, N. Y.

DYER WANTED: Experienced rayon acetate dyer for progressive metropolitan high standing plant. Permanent post-war position assured. State in detail school and plant experience, salary desired, age and man power situation. Write Box No. 515, American Dyestuff Reporter, 440 Fourth Ave., New York, 16, N. Y.

POSITION WANTED: Textile dyer and finisher having excellent practical and technical training wishes to cover Mid-West for dyestuff or chemical house as salesman and demonstrator. Write Box No. 527, American Dyestuff Reporter, 440 Fourth Ave., New York 16, N. Y.

POSITION WANTED: Superintendent of dyeing desires connection with post-war future. Textile school graduate. Seventeen years' experience in yarn and piece dyeing, well versed in chemistry. Draft exempt. Write Box No. 528, American Dyestuff Reporter, 440 Fourth Ave., New York 16, N. Y.

POSITION WANTED: Textile chemist, over 15 years of practical experience with leading dyeing and finishing organizations as research chemist desires connection with progressive organization. Experienced in formulating special finishes for the textile, metal and leather processing industries. Draft deferred. Write Box No. 529, American Dyestuff Reporter, 440 Fourth Ave., New York 16, N. Y.

WANTED: Chemist, male or female, to work in the laboratory of textile finishing plant in New England. State age, education, experience and salary expected. Write Box No. 531, American Dyestuff Reporter, 440 Fourth Ave., New York 16, N. Y.

WANTED: Colorist with some experience in textile printing as well as with vat and napthol dyeing. An opportunity in New York Laboratory for the right young man. Write Box No. 533, American Dyestuff Reporter, 440 Fourth Ave., New York 16, N. Y.

WANTED: Chemist, for research and production on pigments. Staten Island location. Permanent position for right man. State education, experience, and salary desired. Write Box No. 534, American Dyestuff Reporter, 440 Fourth Ave., New York 16, N. Y.

WANTED: Production man, experienced in chemical plant. Permanent position in Staten Island. Give full facts concerning experience, education, and salary desired. Write Box No. 535, American Dyestuff Reporter, 440 Fourth Ave., New York 16, N. Y.

WANTED: Chemist-colorist by Dyestuff Manufacturer for standardization and application laboratory. Location—Massachusetts. Textile graduate preferred. State experience if any. Write Box No. 536, American Dyestuff Reporter, 440 Fourth Ave., New York 16, N. Y.

POSITION WANTED: Experienced manager in the dyeing, printing and finishing industry desires to contact responsible organization with vision and foresight in the development and production of special finishes for the post-war trade. Will consider representing and demonstrating for a reliable chemical house. South territory preferred. Write Box 537, American Dyestuff Reporter, 440 Fourth Ave., New York 16, N. Y.

POSITION WANTED: Textile School graduate in chemistry and dyeing. Also B.A. in Chemistry. Three years in printing successively as color-mixer and assistant chemist-colorist. Five months in chemical and bacteriological testing of textiles. Five months to present research chemist with chemical manufacturing concern. Wish to combine chemical and textile training. Age 29, married, draft status 2B. Write Box No. 538, American Dyestuff Reporter, 440 Fourth Ave., New York 16, N. Y.

WANTED: Textile chemist for development work with supplier in Metropolitan New York, excellent post-war opportunity. Send details of training and experience with snapshot. Write Box No. 539, American Dyestuff Reporter, 440 Fourth Ave., New York 16, N. Y.

NOTE

Essential employees need release statement. Employees who are to be hired for critical occupations need release statement and U. S. E. S. consent.

SANDOZ PRESENTS *The color achievement of the month*

Sage Green BY THE FRANK H. LEE CO.

WISE MEN this spring are wearing Sage Green . . . a new color in a new hat by The Frank H. Lee Co.

Sandoz, whose dyes help create many a fashion leader, congratulates The Frank H. Lee Co. on this distinctive addition to "the hats that are always creased the way you want to wear them."

It is natural that The Frank H. Lee Co. whose unique machines have been developed by their own engineers, should consistently include Sandoz among their suppliers especially since they so often require colors of *exceptional* quality. For Sandoz also relies on the skill of its own technicians in "thinking ahead with textiles".

For instance, Alizarine Light Blue 4 GL, a patented product, is now recognized as the fastest-to-light acid blue on the market. It has ended many troubles formerly encountered in level dyeing piece goods. Other Sandoz developments, such as Metomega Chrome Brown RLL, have brought simplicity and sureness to dyeing operations.

To help you make full use of Sandoz' acid and chrome dyes and auxiliary chemicals for all natural and synthetic fibres, Sandoz application laboratories are at your service in New York, Boston, Philadelphia, Charlotte, Los Angeles and Toronto. Stocks are carried in those cities. Other branches in Chicago, Paterson and Providence.

Another Sandoz "Color Achievement of the Month" — next month — will salute another Sandoz customer. Watch for it.

SANDOZ CHEMICAL WORKS, INC., 61 VAN DAM STREET, NEW YORK 13, N. Y.

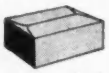
SANDOZ *thinks ahead with textiles*

SANDOZ

DID YOU KNOW?

NATIONAL
supplies large quantities of
ADHESIVES & STARCH PRODUCTS

for winding fiber Shell Containers



for packaging Small Arms Ammunition

for insulating Armored Tanks

for fabricating fiber Oil Filters & Motor Gaskets

for sizing duck Gun Covers

for making Rifle Envelopes

for binding sand Molds & Cores used in casting Gun Mounts, etc.

for assembling Fuses & Grenades

for laminating paper Bomb Rings

for sealing & labeling fiber Export Cases of Parts & Supplies

&

for many other ordnance applications . . . some of a secret nature . . . which contribute to the fire-power of our fighting forces.

THE U. S. ARMY
ORDNANCE DEPARTMENT
provides the FIREPOWER!

THE COURAGE and bravery of our ground and air forces would be costly and ineffective were it not for the weapons and mobility provided by Army Ordnance.

In no other war agency could a deadline failure in the production or shipment of needed guns, ammunition and automotive equipment mean so much to the safety of our boys on the battlefronts, and to the cause for which they are fighting.

National is proud of the high trust that is placed in its adhesives and starch products for such vital war applications as those shown at the left . . . and eager to give first call on its research, service and production facilities to the needs of our armed forces.

Number 2 of a Series

NATIONAL STARCH PRODUCTS
INCORPORATED
270 MADISON AVENUE, NEW YORK 16, N. Y.

PLAINFIELD, N. J. • PHILADELPHIA, PA. • BOSTON, MASS. • CHICAGO, ILL. • INDIANAPOLIS, IND. • SAN FRANCISCO, CAL.

Introducing

THE ANSWER

to your Wetting Problems

THE ALROSE WETTING AGENTS!

Here are two distinctive groups of wetting agents that will speedily and economically accomplish your most difficult wetting assignments.

Sorbit Series — Designed Especially for Woolens and Worsteds

A result of extensive research, this series has high wetting out and penetrating efficiency on woolens and worsteds, and acts as a carbonizing, dyeing, scouring and fulling assistant. Agents in this series make for easy rinsing and are noted for their wetting efficiency based on high money value.

Alronol Series — For General Fabric Use

Characterized by outstanding detergent properties, Alronol wetting and penetrating agents are noted for their efficiency on all types of fabrics in acid or alkaline media, in hard water, or in the presence of metallic salts such as iron, chromium, aluminum etc. Because of this Alronol is effective where other wetting agents cannot be used.

It will pay you dividends in quality and quantity of production to further investigate The Alrose Wetting Agents. Ask The Alrose Advisory Service for complete details . . . no obligation. Address Dept. J.

ALROSE

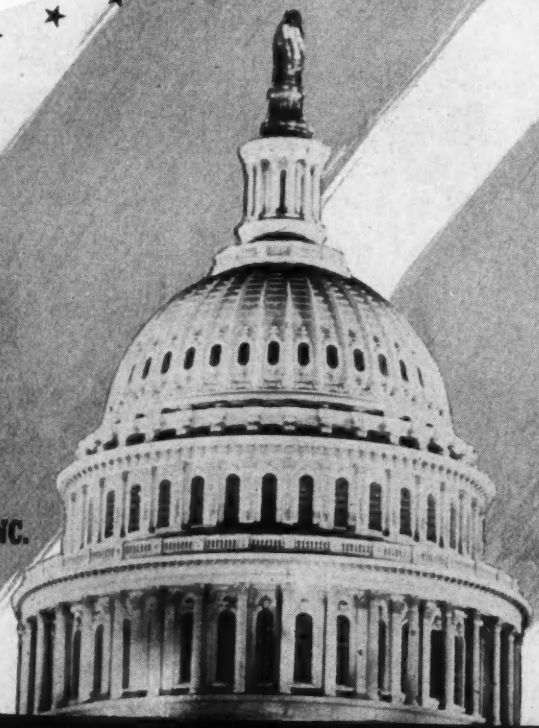
CHEMICAL COMPANY · MANUFACTURERS OF RESEARCH PRODUCTS

PROVIDENCE · RHODE ISLAND

CAMEL DYES
meet government specification

The experience of the Campbell organization, representing over 68 years of uninterrupted dyestuff service to the textile industry, is your assurance of uniformity in the Campbell Line of quality dyestuffs. Whether for service fabrics or consumer demand, Camel Dyes are available ..... *plus* the usual prompt

CAMPBELL SERVICE



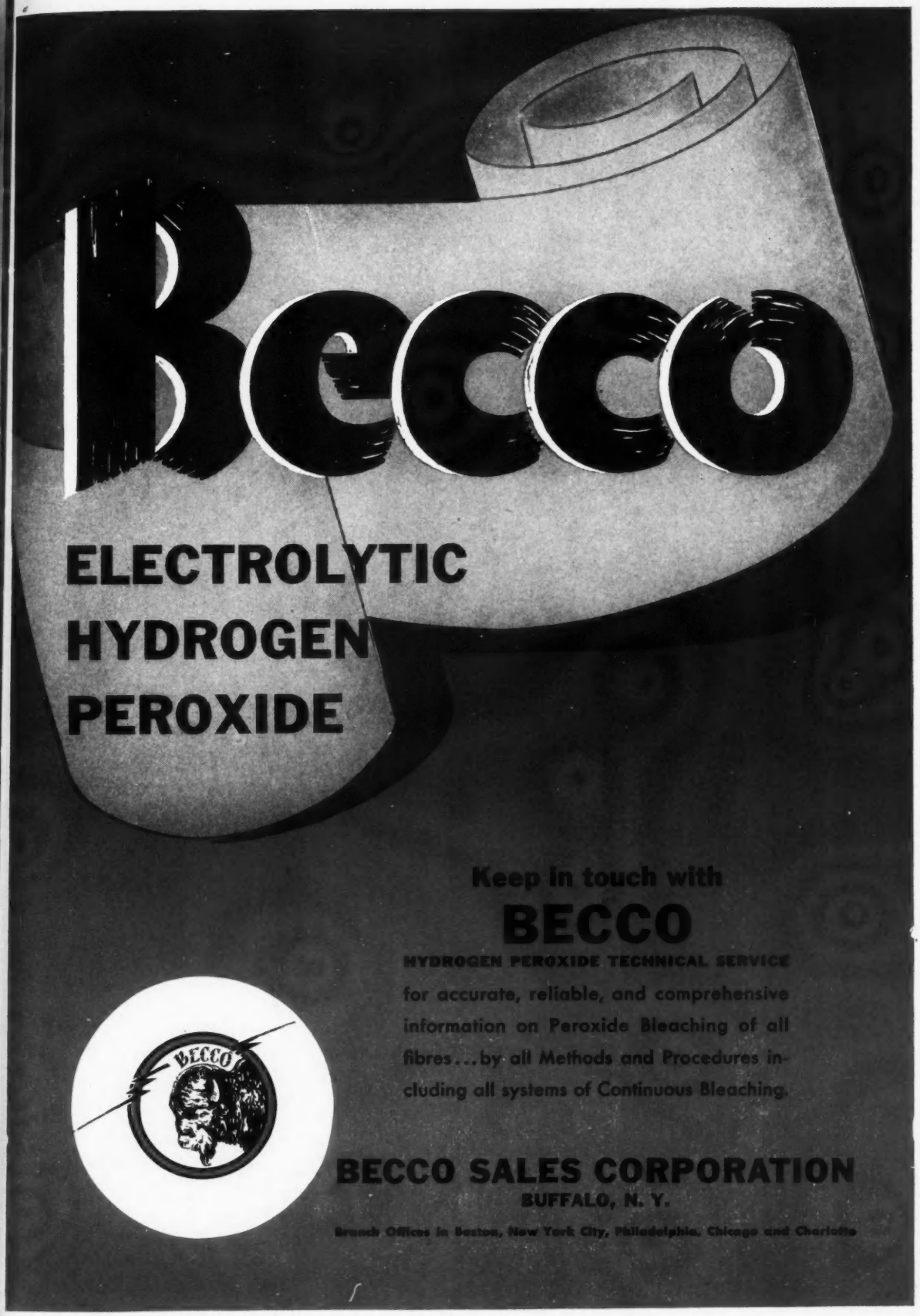
JOHN CAMPBELL & COMPANY, Inc.

75 HUDSON STREET • NEW YORK CITY

TELEPHONE BArclay 7-6228-6229

BRANCH OFFICES AND WAREHOUSES:

PHILADELPHIA BOSTON EAST CLEVELAND ATLANTA


Becco
ELECTROLYTIC
HYDROGEN
PEROXIDE
Keep in touch with
BECCO
HYDROGEN PEROXIDE TECHNICAL SERVICE
for accurate, reliable, and comprehensive information on Peroxide Bleaching of all fibres... by all Methods and Procedures including all systems of Continuous Bleaching.
BECCO
BECCO SALES CORPORATION
BUFFALO, N. Y.
Branch Offices in Boston, New York City, Philadelphia, Chicago and Charlotte

A Quality

CATALYST FROM

A Dependable

SOURCE OF SUPPLY . . .

ALUMINUM CHLORIDE

$AlCl_3$, purity 98-99%
Iron as Fe 0.10%

BY *Givaudan*

Givaudan-Virginia manufactures an anhydrous, high grade aluminum chloride of low iron content especially suitable for Friedel-Crafts reactions, providing a catalytic agent that does not contain titanium tetrachloride, silica or silicon chloride. Available in 75 lb., 300 lb., 600 lb., containers. We shall be pleased to have the opportunity of serving you.

BUY WISELY . . . BUY GIVAUDAN

GIVAUDAN-VIRGINIA, INC.

330 WEST 42nd STREET NEW YORK 18, N. Y.

146 Years Is a Long, Long Time!

The year 1798 saw the birth of our business in New York City . . . nearly a century and a half of steady service to the textile industry.

All through these years, Logwood has dominated as the preferred product for dyeing fast blacks, due to its economy, easy handling, wonderful lustre imparted, speedy and thorough penetration, weight increase effected, etc. For wool, Logwood has particularly outstanding advantages, but it is equally suitable for any textile fabric, including the newcomer Nylon.

Send for our booklet:
"Advantages of Dyeing Wool with Logwood"

American Dyewood COMPANY

22 EAST 40th STREET NEW YORK

BRANCHES:
BOSTON • PHILADELPHIA • CHICAGO

CANADIAN REPRESENTATIVES:
CANADA COLORS & CHEMICALS, LTD., TORONTO
PRESCOTT & CO., Reg'd, MONTREAL

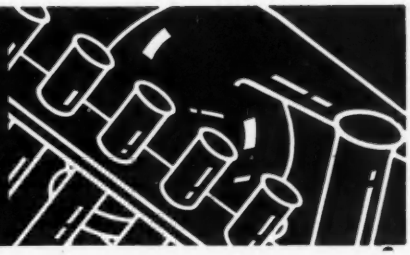
ANILINE DIVISION:
NEW YORK COLOR & CHEMICAL CO.
BELLEVILLE, N. J.

LOGWOOD

first choice for fast blacks

BIXAMINE BROWN BRLL

- Direct
- Homogeneous
- Level Dyeing
- Excellent light fastness



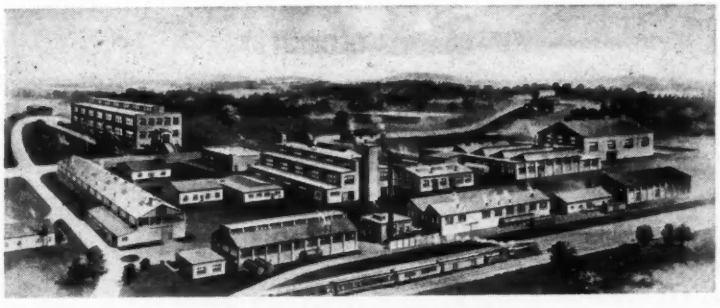
BICK & CO., Inc.

Manufacturing Chemists

Reading, Pa. Charlotte, N. C.

NYANZA

ANILINE & ALIZARINE COLORS
TEXTILE CHEMICALS



FACTORY AT ASHLAND, MASSACHUSETTS

NYANZA COLOR & CHEMICAL COMPANY, Inc.

215 WATER STREET NEW YORK CITY

FACTORIES:

CHEMICAL MANUFACTURING CO., ASHLAND, MASS. • NEW BRUNSWICK CHEMICAL CO., NEWARK, N. J.

BRANCHES:

Ashland, Massachusetts

549 West Randolph St., Chicago, Ill. • 635 Drexel Bldg., Philadelphia, Pa. • 115 S.W. Fourth Ave., Portland, Ore.
2657 Magnolia Ave., Knoxville, Tenn. • 304 E. Morehead St., Charlotte, N. C.

CANADIAN AGENTS:

Charles Albert Smith Limited, 123 Liberty St., Toronto, Canada

MEET THE AXEES
The Gremlins of Accidents

ZANY

Zany thinks he's oh, so cunning
With his rough and reckless funning,
But he causes, with his clowning,
Shootings, broken bones and drowning.
It is neither brave nor brainy
To be a joker a la Zany.

NATIONAL SAFETY COUNCIL

if treated in time

cancer can be cured

Learn the danger signals! Get early diagnosis and prompt treatment. Delay is dangerous! Enlist as a Volunteer in the Women's Field Army of your State and support its activities for Cancer Control.

If you are a resident of the Metropolitan area of New York, write the NEW YORK CITY CANCER COMMITTEE, 130 East 66th Street, New York 21, N.Y.

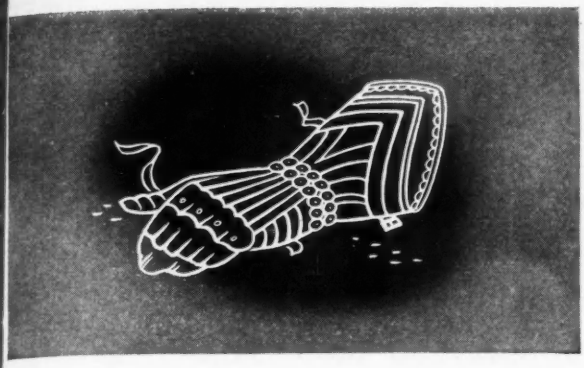
AMERICAN SOCIETY FOR THE CONTROL OF CANCER
350 MADISON AVENUE, N. Y. 17, N. Y.

HASTINGS IRISOL R S

COLOUR INDEX 1073

Hastings Irisol RS is a level dyeing acid violet of outstanding fastness to light. It is recommended for the dyeing of ladies' dress goods, carpet yarn, knitting yarn, upholstery material, hats, etc.

ZINSSER & COMPANY, Inc.
ESTABLISHED 1897
Manufacturing Chemists
HASTINGS-ON-HUDSON NEW YORK



CHALLENGE

Zurnoil for over 60 years has successfully met the challenge for better chemical products for more efficient, more economical processing and finishing of every type of textile product. Continuing research, laboratory controlled manufacture, practical field experience, and the spirit of service are back of the Zurnoil challenge. . . . Zurnoil particularly welcomes the knotty problems which textile manufacturers face today because of new techniques, new fibres, new demands of style and serviceability. Your inquiry will result in a demonstration of the prompt, friendly service which characterizes the Zurnoil organization.

Zurnoil
TEXTILE CHEMICALS

SCOUR "A"
Eliminates the use of soap
PENT LEV S. B.
Superior Penetrating Leveler
ALCOPHATE
(powder or paste)
Efficient Wetting Out, Penetrating and Leveling Agent

O. F. ZURN COMPANY
PHILADELPHIA 32, PA.

KNOXVILLE, TENN. · HAMILTON, ONT., CANADA

STAR SILICATE

MORE than ever, little must do much. So mill superintendents are looking into their various processes with a critical eye. Those who use STAR Brand for a bleaching assistant pocket real savings in peroxide, by having baths properly stabilized.

Careful tests to measure the stabilizing efficiency of alkalis in the peroxide bath when no bleaching material is present in 3 hour periods showed:
WITH SILICATE, no change in peroxide content.
WITH AMMONIA, loss from 15-70%.

Are you acquainted with STAR Brand? Get further information and samples for your experiments.

OTHER STAR FEATURES ★ High standards of purity insure longer life bleach baths. ★ With correct uniform alkalinity, control is easier and first quality goods surer.

STAR BRAND

PHILADELPHIA QUARTZ COMPANY
Gen'l Offices & Lab.: 125 S. Third St., Phila., Pa.
Chicago Sales Office: 205 West Wacker Drive.
Sold in Canada by National Silicates Ltd., Toronto

SILICATE OF SODA

DON'T LET BLEACH ANTICHLOR PROBLEMS SLOW YOU DOWN!

Solve them quickly, correctly with Ansul Liquid Sulfur Dioxide. And for expert help, consult with the Ansul Technical Staff, at any time.

CDR-2-44

LIQUID
Sulfur Dioxide
BY
ANSUL*

REG. U. S. PAT. OFF.

● PLENTIFUL ● ECONOMICAL
● QUICKLY AVAILABLE

ANSUL CHEMICAL COMPANY
MARINETTE, WISCONSIN
EASTERN OFFICE: PAOLI, PENNSYLVANIA

QUALITY RICHMOND PRODUCTS

For Better Rayon Yarn Dyeing
USE
RAYOSOFT

BETTER softener for wool yarns
BETTER finish for Rayons
BETTER Sulphur color Developer
BETTER after treatment for nub yarns

Write for Free TRIAL Sample—
Enough for a trial run.

OUR TECHNICAL
DEPARTMENT IS
AT YOUR SERVICE

RICHMOND OIL, SOAP & CHEMICAL CO., Inc.
151-155 RICHMOND STREET, PHILADELPHIA 25, PA.

THE STANDARD DE-SIZING AGENT

RAPIDASE

Dependable, speedy and economical de-sizing . . . Our technical staff always at your service.

● *for cottons rayons and mixed goods*

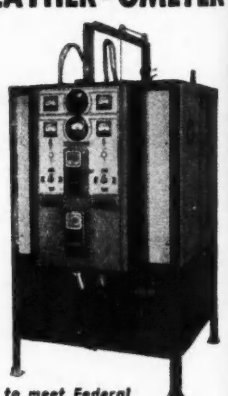
WALLERSTEIN CO., INC.
180 MADISON AVENUE, NEW YORK

WEATHERING TEST FOR TEXTILES

Weathering effects of sunlight, rain, heavy dew and thermal shock reproduced in the laboratory at an accelerated rate that reduces years of actual weathering to a few days of testing in the —

ATLAS TWIN-ARC WEATHER-OMETER

The Twin-Arc Weather-Ometer has full automatic control of light and water periods. The Atlas Cycle Timer unit can be set to reproduce any combination of weathering conditions. A direct reading thermal regulator, automatic shut-off switch and a running time meter is included on the control panel. After setting exposure cycle on the control panel the Weather-Ometer is safe to be left in continuous operation over night without attention except to replace carbons once in 24 hours.



The Atlas Weather-Ometer is required to meet Federal Specifications demanding accelerated weathering tests.

ATLAS ELECTRIC DEVICES COMPANY
361 W. Superior Street, Chicago 10, Illinois

Originators and sole manufacturers for over a quarter of a century . . . Weather-Ometers, Launder-Ometers, Fade-Ometers are the accepted standard accelerated testing machines all over the world.

FREE

Your copy of our new 144-page catalogue—"Chemicals by Glyco"—is full of information on products, processes and uses. Tables and suggested formulae may help solve your problems both for war and post-war needs. Send for your free copy today.

GLYCO
PRODUCTS CO., INC.
26 COURT ST., BROOKLYN 2, N. Y.

CHEMICALS BY GLYCO

PERFECTION!

DIASTAFOR desizing agent means perfection every time—smooth, supple, flawless fabrics that pass the most rigid tests.

DIASTAFOR saves many costly mistakes, affords economy. Chemists and mill-owners praise it highly, recommend it enthusiastically.

Remember—there's only *one* **DIASTAFOR!** *For further details, see our technical man or write to—*

FLEISCHMANN'S DIASTAFOR
Standard Brands Incorporated
DIASTAFOR DIVISION
40 Worth Street New York 13, N. Y.

DIASTAFOR
36 Years of Satisfactory Results

HYDROXY-MILDEW PROOF No. 2

to meet tentative Army Specifications T-1452A

One of many exclusive Kali products now in use for military and civilian textile production.

Other Textile Chemicals now in demand:

AQUAKAL* No. 73 for wetting out ducks for mineral or vat dyeing; re-wetting in sanforizing; for wetting piece goods, skeins, packages or raw stocks.

AQUAKAL No. 74, for pasting vat dyes.

HYDROXY*—WATER SHIELD

*(Reg. U. S. Pat. Off.)

Kali

MANUFACTURING COMPANY
Manufacturing Chemists
427 Moyer Street, Philadelphia 25, Pa.

2 GOOD CHEMICALS FOR COTTON GOODS

V VIRGINIA

"VIRGINIA" (SODIUM) HYDRO

A dependable Hydrosulfite for Vat Dyeing and Stripping.

1. Crystalline, stable
2. Free-flowing; non-caking
3. Easily and Quickly soluble

Packed in 250 lb. *airtight* containers.

"VIRGINIA" (LIQUID) SO_2 THE IDEAL ANTICHLOR

The "Old Reliable" of the finishing plant. Low concentrations...

— remove active chlorine
— neutralize residual alkalinity
— eliminate excessive washing

Constant make-up by continuous flow to the pit. Shipped in steel cylinders containing 150 lb. net weight.

VIRGINIA SMELTING CO.
WEST NORFOLK, VIRGINIA

STAR PRODUCTS for PROCESSING MILITARY FABRICS

FUNGICIDE G

To meet government specifications for mildewproofing sleeping bags, webbing, tentage, shoe linings, tapes, mosquito netting, etc. . . non toxic . . non irritating.

ARKO FIRE RETARDANT

For flameproofing uniform cloth, tentage, felts, etc.

AQUAROL*

Produces a water-repellent finish on uniform cloth, overcoatings, and other military fabrics . . . used in a single bath treatment with Fungicide G to impart water-repellency and mildew resistance . . . used in a single bath treatment with Arko Fire Retardant to produce water-repellency and fire-resistance.

CULOFIX L*

For preventing color-bleed in water of direct dyed cotton.

*Reg. U.S. Pat. Off.

ARKANSAS CO., INC.

MANUFACTURERS OF AC INDUSTRIAL CHEMICALS

NEWARK INC NEW JERSEY

Established for over 38 years

INDEX TO ADVERTISERS

Alrose Chemical Co.	XXV
Althouse Chemical Co.	
American Aniline Products, Inc.	Third Cover
American Cyanamid & Chemical Corp.	Second Cover
American Dyewood Co.	XXVIII
American Viscose Corp.	IX
Ansul Chemical Co.	XXXII
Aqua-Sec Corp.	
Aridye Corp.	
Arkansas Company	XXXIV
Arnold-Hoffman & Co., Inc.	
Atlantic Chemical Co.	
Atlas Electric Devices Co.	XXXII
Becco Sales Corp.	XXVII
Bick & Co., Inc.	XXIX
Burkart-Schier Chemical Co.	XXXV
Butterworth & Sons Co., H. W.	
Calco Chemical Division, American Cyanamid Co.	XXII
Campbell & Co., Inc., John	XXVI
Carbic Color & Chemical Co.	XX
Carbide & Carbon Chemicals Corp.	
Plastics Division	
Ciba Company, Inc.	III
Colgate-Palmolive-Peet Co.	
Commonwealth Color & Chemical Co.	
Continental Chemical Co.	
Cravenette Co.	XII
Du Pont de Nemours & Co., E. I.	
Grasselli Chemicals Dept.	
Electrochemicals Dept.	
Electro Metallurgical Co.	
Emery Industries, Inc.	
Exact Weight Scale Co.	
Fancourt & Co., W. F.	
Gardinol Corp.	
Geigy Company, Inc.	Front Cover
General Dyestuff Corp.	VII
Givaudan-Virginia, Inc.	XXVIII
Glyco Products Co., Inc.	XXXIII
Hercules Powder Co.	IV
Cellulose Products Dept.	XVII
Hooker Electrochemical Co.	
Hotel Manger	
Houghton & Co., E. F.	VIII
Industrial Rayon Corp.	
Kali Manufacturing Co.	XXXIII
Kelco Co.	
Laurel Soap Mfg. Co.	
Leatex Chemical Co.	
Mathieson Alkali Works, Inc.	
Monsanto Chemical Co.	
National Aniline Division, Allied Chemical & Dye Corp.	XIX
National Carbon Co., Inc., Carbon Products Division	
National Starch Products	XXIV
New Jersey Zinc Co.	
Nyanza Color & Chemical Co.	XXIX
Onyx Oil & Chemical Co.	V
Perkins & Son, Inc., B. F.	VI
Philadelphia Quartz Co.	XXXI
Procter & Gamble	XIV
Refined Products Co.	
Richmond Oil, Soap & Chemical Co., Inc.	XXXII
Rohm & Haas Co.	XXXVI
Royce Chemical Co.	Back Cover
Sandoz Chemical Works	XXIII
Scholler Bros., Inc.	
Socony-Vacuum Corp.	
Solvay Sales Corp.	
Sonneborn Sons, Inc., L.	
Smith, Drum & Co.	
Standard Brands, Inc.	XXXIII
Stein, Hall & Co., Inc.	
Sylvania Industrial Corp.	XV
Tennessee Eastman Corp.	XIII
Union Carbide & Carbon Corp.	
Van Vlaanderen Machine Co.	
Virginia Smelting Co.	XXXIII
Wallerstein Co., Inc.	XXXII
Westvaco Chlorine Products Corp.	XI
Wolf & Co., Jacques	X
Young Aniline Works	
Young Co., J. S.	
Zinsser & Co.	XXX
Zurn Co., O. F.	XXXI

ERS
XXV
ird Cover
nd Cover
XXVIII
IX
XXXII
XXXIV
XXXII
XXVII
XXIX
XXXV
XXII
XXVI
XX
III
XII
t Cover
VII
XXVIII
XXXIII
IV
XVII
VIII
XXXIII
XIX
XXIV
XXIX
V
VI
XXXI
XIV
XXXII
XXVI
Cover
XXIII
XXIII
XV
XIII
XXIII
XXII
XI
X
XXX
XXI
ORTER

THE ROLE OF CHEMISTRY In the Development of Textiles

NO. 4 OF A SERIES

FORBIDDEN CALICO

Glamorous Persanes—colorful Indiennes—these richly printed cotton fabrics from the East, intrigued French women of fashion in the middle of the eighteenth century. But the appearance of these printed cottons drew forth tortured cries of protest from the manufacturers of silk and wool.

In 1686, Claude Lepeletier, Comptroller General of Finance, prohibited the importation of printed goods and suppressed workshops in France making them from wood blocks with pigment dyes. As a result, the printing industry was scattered all over Europe and England.

In France, the laws against printed cotton only increased its popularity. In spite of the most rigorous edicts, it continued to be manufactured, continued to be imported, continued to be sold. The value of printed fabrics illegally manufactured or smuggled from abroad, amounted to sixteen million francs in a single year.

In 1759, the order suppressing cotton printing was repealed. And the industry started functioning legitimately on a large scale. Since then textile men have learned that improvements built into fibers and fabrics by textile chemists and colorists are likely to overcome all obstacles and go on to win acceptance from both the trade and the consumer.

BURKART-SCHIER CHEMICAL CO.

Manufacturing Chemists for the Textile Industry. In peace and war, our products are always on the job improving the finish of yarns and fabrics.

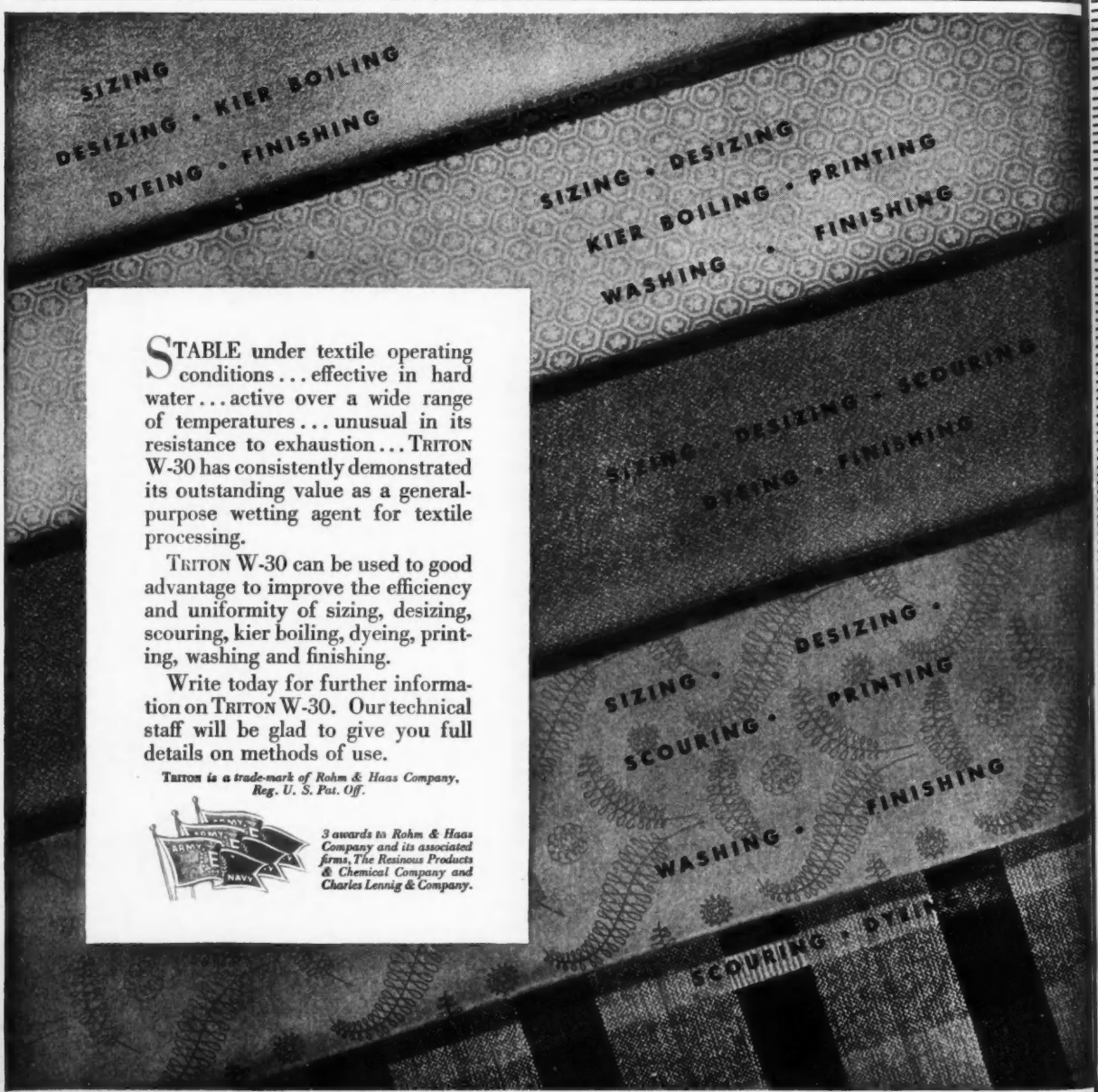
CHATTANOOGA, TENNESSEE

BURK-SCHIER

PENETRANTS DETERGENTS SOFTENERS REPELLENTS FINISHES

Time-tested leadership as an all-purpose surface-active material

TRITON W-30



STABLE under textile operating conditions . . . effective in hard water . . . active over a wide range of temperatures . . . unusual in its resistance to exhaustion . . . TRITON W-30 has consistently demonstrated its outstanding value as a general-purpose wetting agent for textile processing.

TRITON W-30 can be used to good advantage to improve the efficiency and uniformity of sizing, desizing, scouring, kier boiling, dyeing, printing, washing and finishing.

Write today for further information on TRITON W-30. Our technical staff will be glad to give you full details on methods of use.

TRITON is a trade-mark of Rohm & Haas Company, Reg. U. S. Pat. Off.

3 awards to Rohm & Haas Company and its associated firms, The Resinous Products & Chemical Company and Charles Lennig & Company.

ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Manufacturers of Chemicals for the Textile, Leather and other Industries . . . Plastics . . . Synthetic Insecticides . . . Fungicides . . . Enzymes

LEVELENE*

FREE FLOWING, NON-JELLING

More than a trade name.

A penetrant and levelling medium for direct, union, and CELANESE* dyes.

Effective either for stripping or for level dyeing when working with many of the vat type dyes.

A stable, dispersing penetrant for rotproof and mildewproof processing.

Economical and labor saving.

RATHER than ask for a laboratory sample—HAVE one of our technical men bring with him a sufficient quantity for a practical mill run. THEN judge for yourself as many mills have done and profited thereby.

*Reg. U. S. Pat. Off.

AMERICAN ANILINE PRODUCTS, INC.
50 UNION SQUARE
NEW YORK, N. Y.

— Dyestuffs —
Plant: Lock Haven, Pa.

BRANCHES

Providence, R. I.
55 Pine Street

Philadelphia, Pa.
210 N. 13th Street

Toronto, Can.
Dominion Anilines & Chemicals, Ltd.
265 Adelaide Street West

Boston, Mass.
190 High Street

Chicago, Ill.
820 South Clinton Street

Charlotte, N. C.
301 East Seventh Street

Los Angeles, Cal. — 1019 South Grand Avenue

*Reg. U. S. Pat. Off.

Official U. S. Marine Corps Photo

FOR VAT DYEING AND STRIPPING

Extensively Used in Dyeing Cloth for Uniforms

- **HIGH STABILITY:** The high stability of *Vatrolite** is the result of careful laboratory control during manufacture. *Vatrolite** develops no objectionable odor of sulphur dioxide gas.
- **GRANULAR UNIFORMITY:** The Royce unique method of manufacturing assures you of granular uniformity when you use *Vatrolite**. There is less dust; less waste; and greater ease in handling.
- **FULL STRENGTH:** The full strength of *Vatrolite** assures dependable performance throughout the longest runs.

A "Must" for Color Reduction in Vat Dyeing

ROYCE CHEMICAL COMPANY

CARLTON HILL, NEW JERSEY

MANUFACTURERS OF HYDROSULPHITES, *VATROLITE, *DISCOLITE, *PAROLITE, ALSO *NEOZYME, *VELVORAY, *CASTROLITE, *FABRITEX AND *GUMOLI

*Reg. U. S. Pat. Off.

ps Photo

rol
ur

of
e;

ut

Y

*GUMOLI